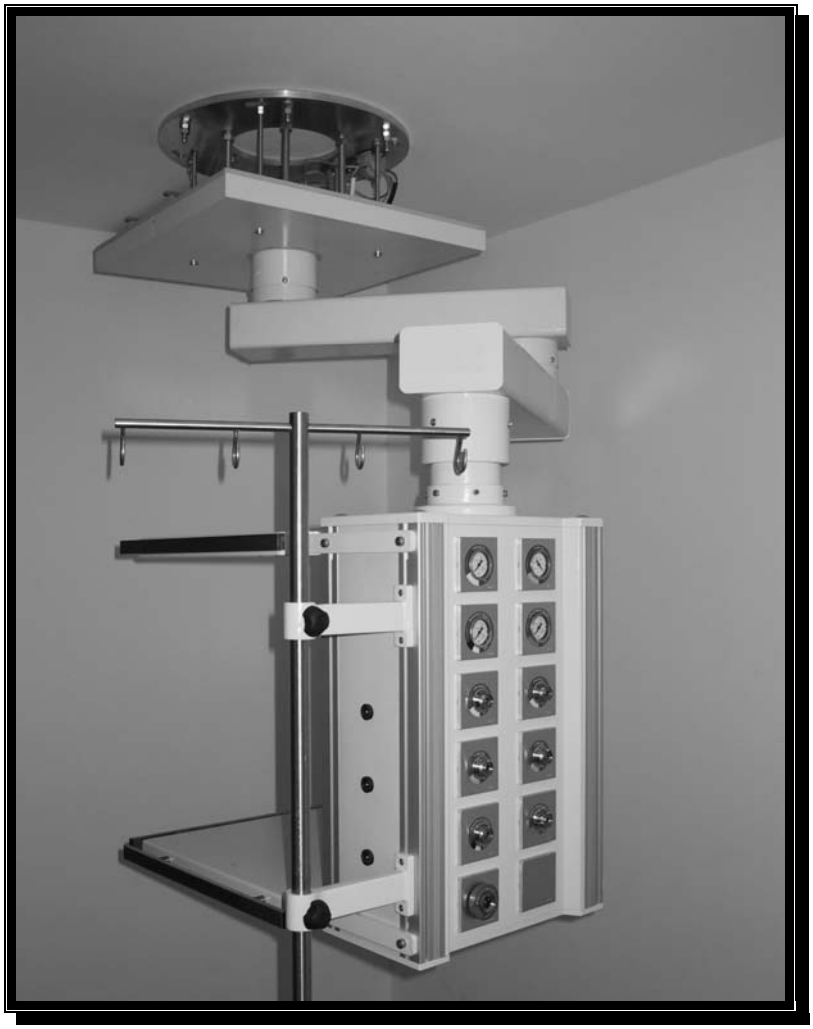
nassetti

BRIDGE

Pendant Arm



Planning and Installation Instructions

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BRIDGE

Pendant Arm

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BRIDGE

Pendant Arm

1. Notes On These Instructions

The preparatory measures described here ensure the safe planning of the main requirements for the installation and operation of BRIDGE pendant arms.

- Our rights for making any technical modifications in order to improve the product are reserved.
- Please read these instructions very carefully and observe the safety notes in these instructions and specifications for installation.
- The contents of these instructions can be altered at any time without warning.
- Where there are translations into foreign languages, the English version of these instructions is binding.

Forms:
In Section 13 of these instructions, there are two forms, which must be used to document the following important data:

- Form 1 Minimum specifications for fixing with heavy-load anchors
- Form 2 Declaration of Acceptance

Trademarks:

- BRIDGE is a registered trademark of Nassetti.
- All other trademarks mentioned in these instructions are the sole property of the manufacturers concerned.

1.1. Explanation of Symbols

Symbols are used to alert you on possible operational or installation faults or give you useful tips on how to use the equipment.

IMPORTANT!
The safety symbol alerts you on critical safety information and information necessary to obtain approval.

NOTE!
The note symbol gives you tips and useful information.

2. Safety Instructions

2.1. Positioning Requirements

- The options and the conditions for fixing BRIDGE pendant arms are described in the following sections. The pendant arms must be fixed in consultation with the construction manager during installation procedures.
- The methods described for the ceiling fixation, gas and power supply are general recommendations and their implementation is to be planned and designed for each individual case by qualified experts.
- BRIDGE pendant arms are not suitable for use in potentially explosive areas.
- An ambient temperature of 10°C to 40°C must be maintained during operation.
- The relative humidity must not exceed 75%.

2.2. Intended Use

- BRIDGE pendant arms are intended to carry and position medical devices in operating theaters and intensive care units and to supply these devices with electricity and medical gases. In operating theaters, they also provide the option of evacuation of anaesthetic gases, compressed gases and provision of compressed driving gases.
- BRIDGE pendant arms are suitable for continuous duty.
- BRIDGE pendant arms can be customized with additional fittings

2.3. Instructions for Installation and Operation

Installation, testing and operation of pendant arms must be carried out in accordance with EN 60601-1, EN 737-2, and EN 737-3 and in accordance with the manufacturer's instructions.

3. Ceiling Fixations

3.1. Static Fixing Requirements

The static certificate must be prepared prior to the installation of the ceiling fixation. Nassetti provides a corresponding form with every ceiling fixation system supplied.

- The static's of the ceiling must be designed so that the loads of the pendant arms and the installed lighting systems or fittings, as well as any other loads present are safely carried and distributed.
- The applicable regional building specifications must be observed.
- Static calculations for the ceiling fixation and the load distribution in the ceiling must be provided.
- The load-bearing capacity of the structure must be de signed, tested and confirmed by a structural engineer.
- The interface plate or ceiling anchorage plate must lie flush with the raw ceiling.

If an existing interface plate or ceiling anchorage plate is used, care must be taken to ensure that:

- The plate and the bolts are rust-free and in perfect condition.
- The holes and bolts in the interface plate or ceiling anchorage plate fit the corresponding part of the upper joint of the carrying arm.
- A static certificate must also be provided for the existing interface plate or ceiling anchorage plate.

The data for the calculation of the ceiling load can be taken from the following tables: table 1, maximum masses and bending moments and table 2, load-bearing capacities. The specified regional safety factors should also be included in calculations.

Table 1:

Type of the pendant arm	Vertical mass	Bending moments
Single arm	3000N	1900Nm
Double arm	5300N	3500Nm

Table 2:

Type of the pendant arm	Maximum carrying capacities
500mm, 600mm, 650mm, 850mm and 1000mm single arms with single joint	150kg
500+500mm Single arm with double joint	150kg
600+600mm Single arm with double joint	125kg
650+650mm Single arm with double joint	115kg

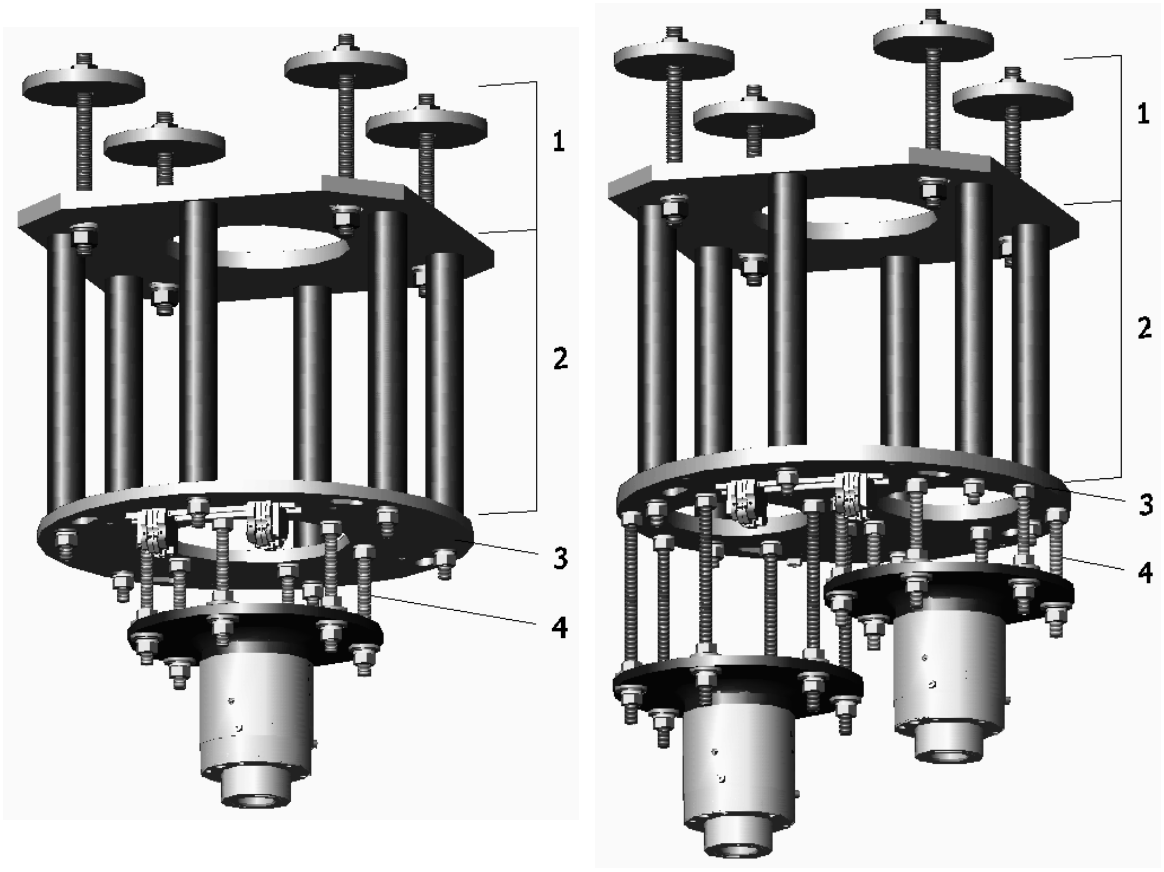
3.2. Definitions:
Figure 1 show an interface plate (3), threaded rods, nuts and washers (4) on the interface plate, ceiling suspension system for intermediate ceilings (2) and a counter plate set (1) for single and double arm type pendant arms.

3.2.1. Interface Plate
BRIDGE pendant arms are installed using an interface plate. Interface plate is the component used for the installation of pendant arms and acts as an interface between the mains supply lines and the supply connections to the pendant arms.

3.2.2. Ceiling Suspension System For Intermediate Ceiling
Nassetti offers a ceiling suspension system for intermediate ceilings for the installation of BRIDGE pendant arms, where the distance between raw and intermediate ceilings necessitates the use of some intermediate ceiling structures.

3.2.3. Counter Plate Set
Nassetti offers a complete counter-plate set, which can be used for fixing with counter–plate.

Fig. 1:



3.3. Ceiling Height Adjustments

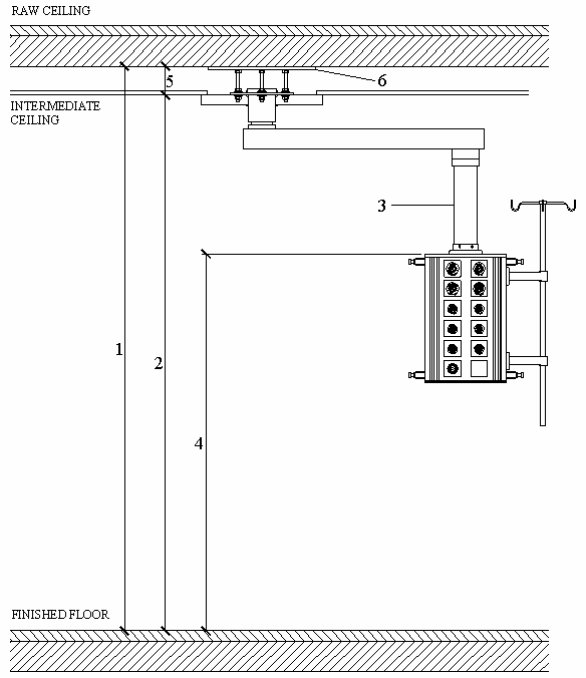
Depending on the ceiling structure, different components are used to fix the pendant arms to the ceiling.

The absolute mounting height is limited between the minimum ceiling height and the maximum ceiling height. When fixing pendant arms, higher or lower values cannot be used. Precise details on this are listed in Tables 3 and 4.

3.3.1. Solution 1

If the distance between the raw ceiling and the intermediate ceiling is more than 140mm and less than or equal to 240mm for the single arm type pendant arms and more than 240mm and less than or equal to 280mm for the double arm type pendant arms; the interface plate is installed onto the raw ceiling. The threaded bolts on the interface plate can span this small intermediate distance.

Fig. 2:



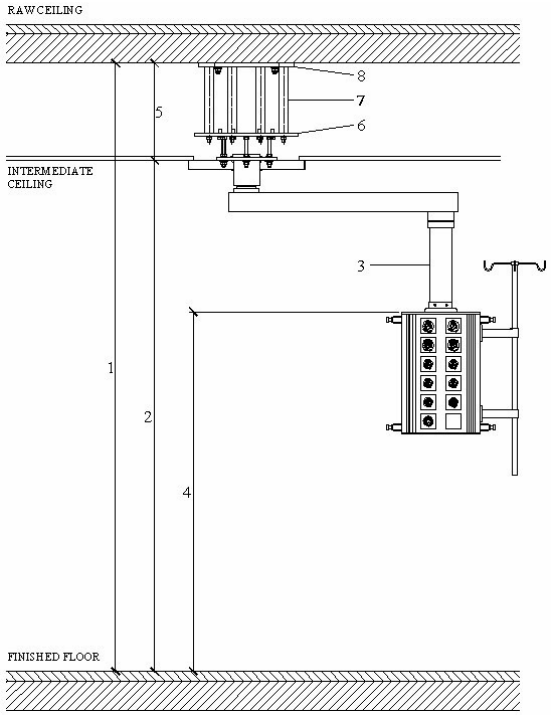
1) Height of the raw ceiling from the finished floor
2) Height of the intermediate ceiling from the finished floor
3) Column (variable length)
4) Height of the upper edge of the console (1850mm) from the finished floor
5) Distance between intermediate ceiling and raw ceiling
6) Interface plate

3.3.2. Solution 2

If the distance between the raw ceiling and the intermediate ceiling is between 241mm and 960mm for the single arm type pendant arms and between 281mm and 960mm for the double arm type pendant arms, the ceiling height is adjusted as follows:

- In the area between the raw ceiling and the intermediate ceiling, using a ceiling suspension system for intermediate ceiling.
- In the area between the intermediate ceiling and the finished floor, using columns of variable length.

Fig. 3:



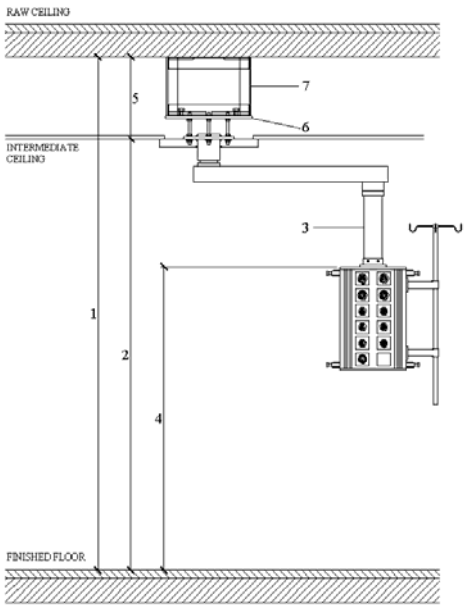
1) Height of the raw ceiling from the finished floor
2) Height of the intermediate ceiling from the finished floor
3) Column (variable length)
4) Height of the upper edge of the console (1850mm) from the finished floor
5) Distance between intermediate ceiling and raw ceiling (≤960mm)
6) Interface plate
7) Ceiling suspension system for Intermediate ceiling
8) Ceiling anchorage plate from ceiling suspension system for intermediate ceiling

3.3.3. Solution 3

If the distance between the raw ceiling and the intermediate ceiling is more than 960mm for either single or double arm type pendant arms, the ceiling height is adjusted as follows:

- In the area between the raw ceiling and the intermediate ceiling, using a mains ceiling substructure.
- In the area between the intermediate ceiling and the finished floor, using columns of variable length.

Fig. 4:



1) Height of the raw ceiling from the finished floor
2) Height of the intermediate ceiling from the finished floor
3) Column (variable length)
4) Height of the upper edge of the console (1850mm) from the finished floor
5) Distance between intermediate ceiling and raw ceiling
6) Interface plate
7) Ceiling substructure

3.4. Minimum Ceiling Heights

Table 3, shows the minimum possible ceiling heights for the installation of different pendant arm types.

The distance between the upper and lower edges of the pendant arm console and the finished floor must remain between ergonomical limits. The values in Table 3 are determined, assuming that the distance between the upper edge of the console and the finished floor is at least 1850mm. In exceptional cases, the height may be different. In these cases, the installation should be made in accordance with the special working drawing.

Table 3:

Type of pendant arm	Min. height intermediate ceiling	Min. height raw ceiling	Min. distance intermediate ceiling / raw ceiling
Single arm with single joint	2324mm	2464mm	140mm
Single arm with double joint	2506mm	2646mm	140mm
Double arm	2516mm	2756mm	240mm

For intermediate ceiling structures, the distance must not be less than the minimum distance between the raw ceiling and the intermediate ceiling.

3.5. Maximum Ceiling Heights With Basic Components

Table 4, shows the maximum possible ceiling heights for the installation of different pendant arm types when mounting them using a ceiling suspension system for intermediate ceiling.

Table 4:

Type of pendant arm	Max. height intermediate ceiling	Max. height raw ceiling	Max. distance intermediate ceiling / raw ceiling
Single arm with single joint	3024mm	3984mm	960mm
Single arm with double joint	3256mm	4216mm	960mm
Double arm	2516mm	3476mm	960mm

3.6. BRIDGE Ceiling Fixation System Components

3.6.1. Interface Plates

The interface plate consists of steel plate, threaded rods, and the appropriate nuts and washers.

3.6.4.2. Interface Plates For Single Arm Type Pendant Arms

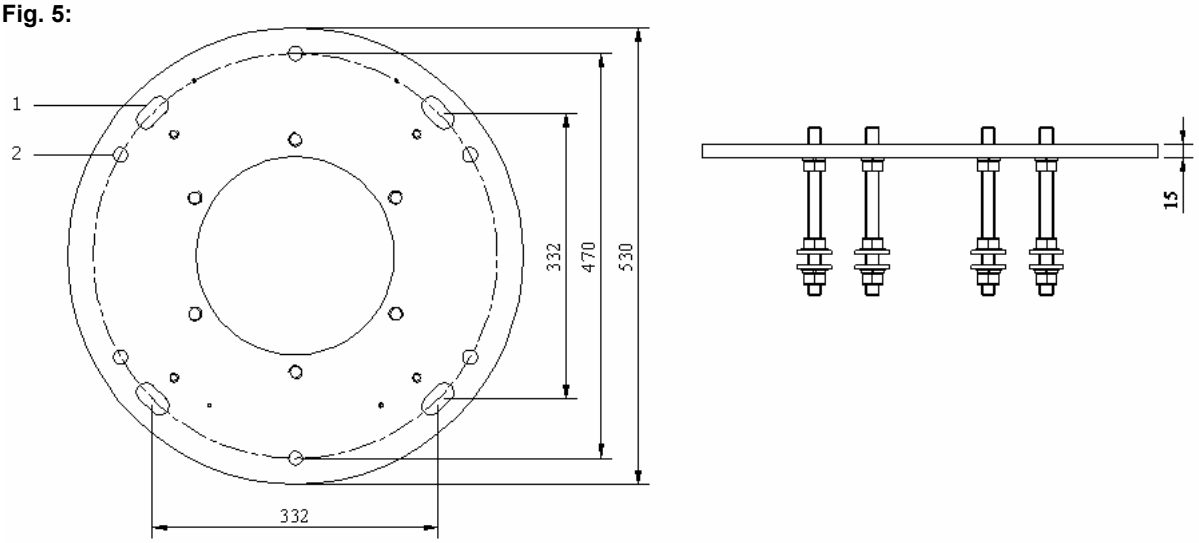
Fixing holes:

- For fixing to raw ceiling or ceiling substructure: Four long holes 22x50mm (1) at pitch circle diameter 470mm.
- For fixing to ceiling suspension system for intermediate ceiling: Six holes ø17mm (2) at pitch circle diameter 470mm.

Material of plate: St 52-3

Dimensions of plate: ø530x15mm

Fig. 5:



Supplied components:

- 6 pieces M16x315mm threaded rods DIN 976, material 8.8
- 18 pieces M16 hexagon nuts DIN 934
- 12 pieces spring washers
- 12 pieces plain washers
- 12 pieces plastic insulating washers

3.6.4.2. Interface Plates For Double Arm Type Pendant Arms

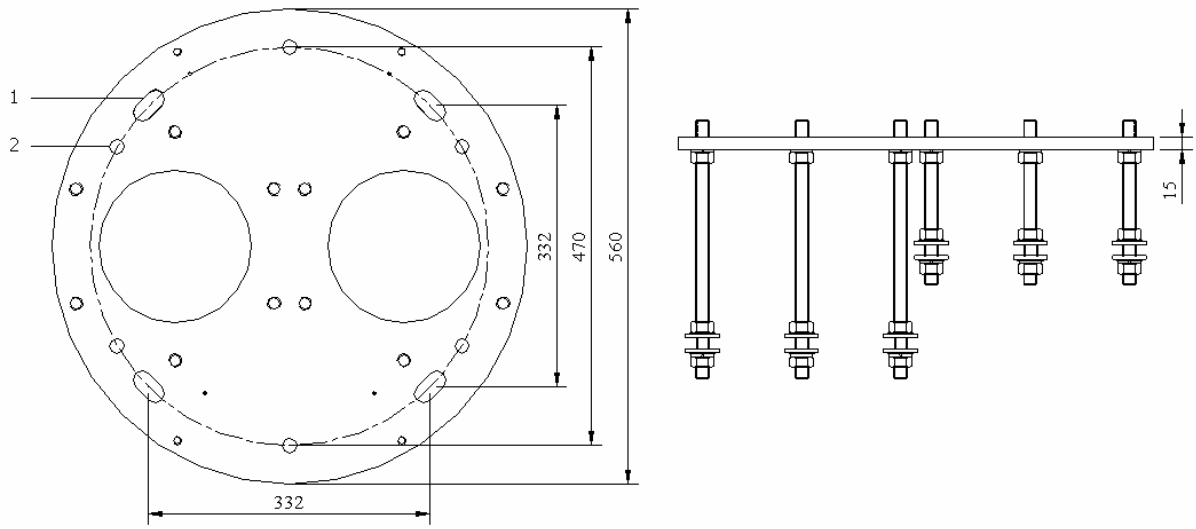
Fixing holes:

- For fixing to raw ceiling or ceiling substructure: Four long holes 22x50mm (1) at pitch circle diameter 470mm.
- For fixing to ceiling suspension system for intermediate ceiling: Six holes ø17mm (2) at pitch circle diameter 470mm.

Material of plate: St 52-3

Dimensions of plate: ø560x15mm

Fig. 6:



Supplied components:
- 6 pieces M16x315mm threaded rods DIN 976, material 8.8
- 6 pieces M16x205mm threaded rods DIN 976, material 8.8
- 36 pieces M16 hexagon nuts DIN 934
- 24 pieces spring washers
- 24 pieces plain washers
- 24 pieces plastic insulating washers

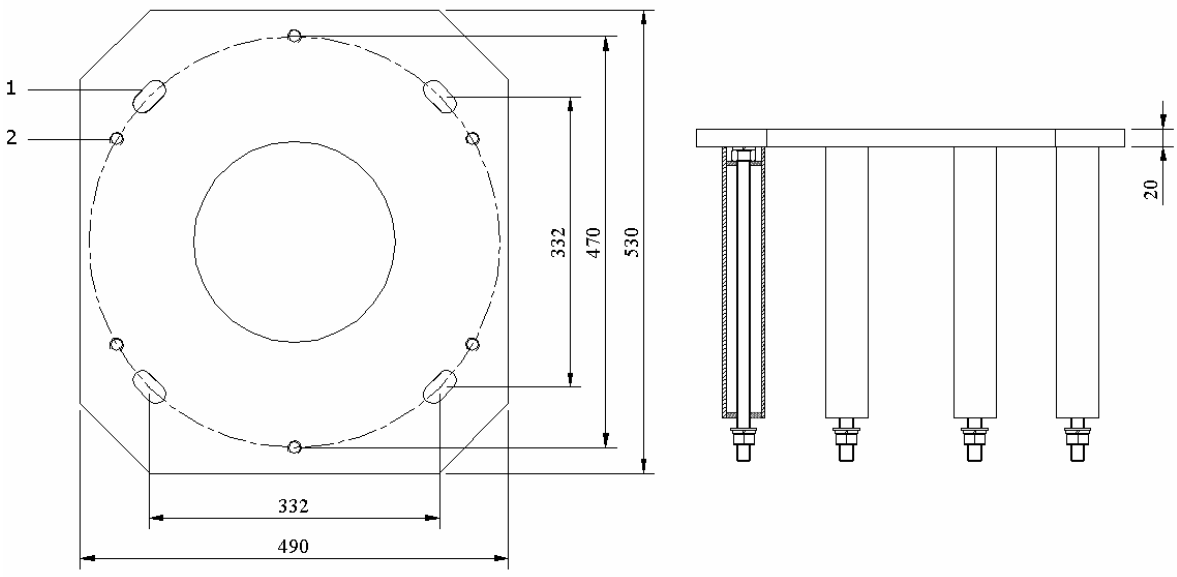
3.6.2. Suspension Systems For Intermediate Ceiling Structures

The ceiling suspension system for intermediate ceilings consists of steel ceiling anchorage plate, threaded rods, spacer tubes and the appropriate nuts and washers. It is used to span a maximum distance of 960mm between the raw ceiling and the intermediate ceiling.

Fixing holes:
- For fixing to raw ceiling: Four long holes 22x50mm (1) at pitch circle diameter 470mm.
- For fixing of the threaded rods and spacer tubes of the ceiling suspension system for intermediate ceiling: Six threaded holes M16 (2) at pitch circle diameter 470mm.

Material of plate: St 52-3
Dimensions of plate: 530x490x20mm

Fig. 7:



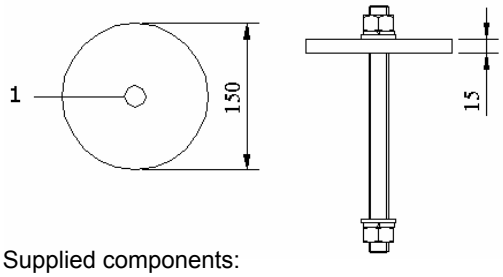
Supplied components:
- 6 pieces ø 48,4mm spacer tubes (max. 760mm)
- 6 pieces M16 threaded rods DIN 976, material 8.8 (max. 830mm)
- 12 pieces M16 hexagon nuts DIN 934
- 12 pieces spring washers
- 6 pieces plain washers
- 12 pieces plastic centering parts for the tubes

3.6.3. Counter-Plate Sets
The counter-plate set consists of four steel plates, threaded rods, and the appropriate nuts and washers.

Fixing holes:
- For fixing to raw ceiling: one hole ø22mm (1).

Material of plate: St 52-3
Dimensions of plate: ø150x15mm

Fig. 8:



Supplied components:
- 4 pieces M20x400mm threaded rods DIN 976, material 8.8
- 8 pieces M20 hexagon nuts DIN 934
- 8 pieces spring washers
- 4 pieces plain washers

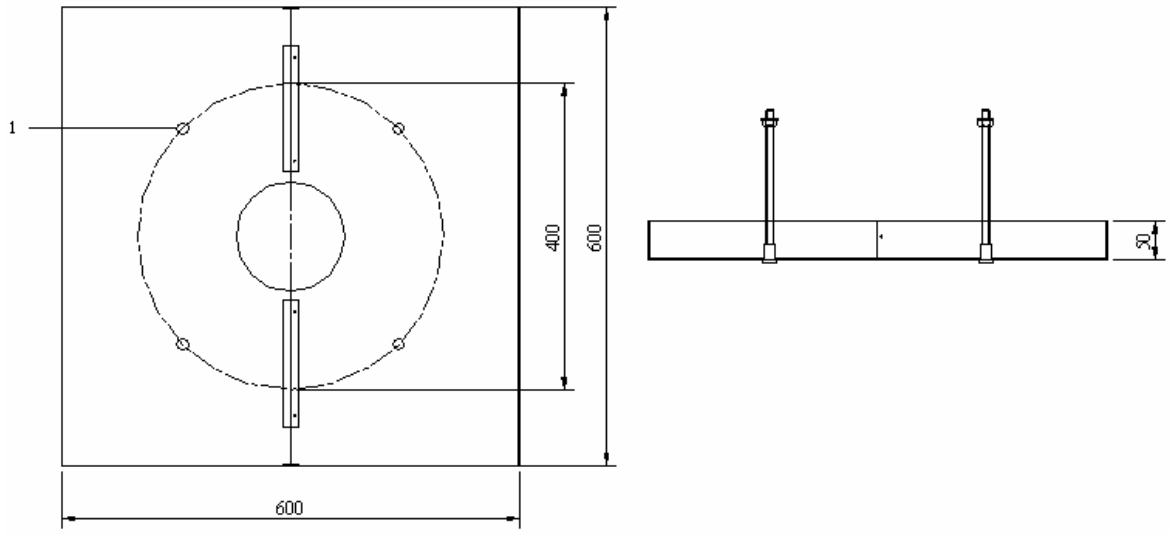
3.6.4. Intermediate Ceiling Opening Covers
The intermediate ceiling opening covers consists of two steel cover halves, threaded rods, and the appropriate nuts.

3.6.4.2. Intermediate Ceiling Opening Covers For Single Arm Type Pendant Arms

Fixing holes:
- For fixing to interface plate: Four holes ø14,5mm (1) at pitch circle diameter 400mm.

Dimensions of plate: 600x600x50mm

Fig. 9:



Supplied components:

- 4 pieces M10x325mm threaded rods DIN 975
- 4 pieces M10 special nuts
- 4 pieces M10 hexagon nuts DIN 934
- 4 pieces plain washers
- 6 pieces sheet metal screw
- 2,85 meters “U” type molded strip

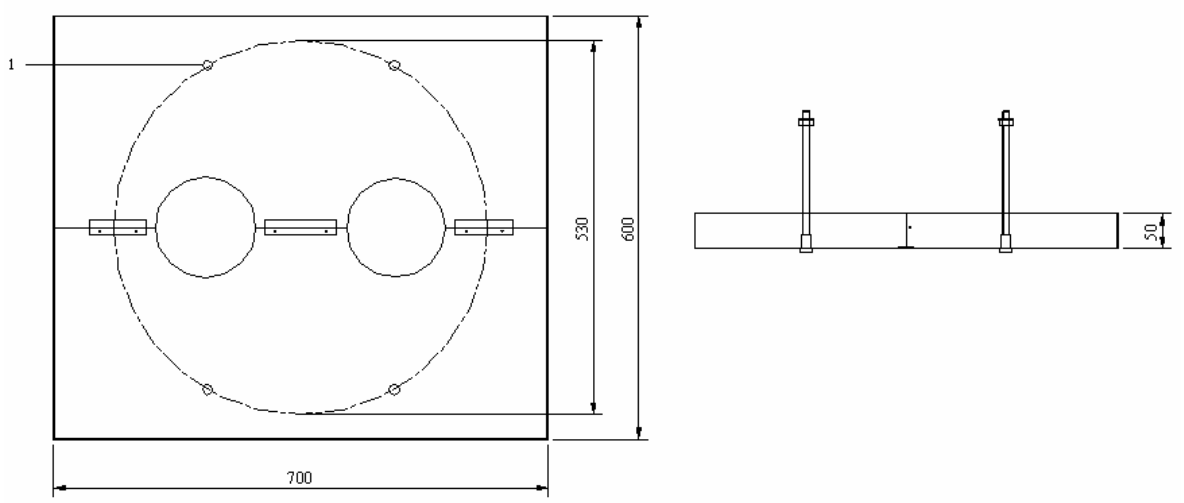
3.6.4.2. Intermediate Ceiling Opening Covers For Double Arm Type Pendant Arms

Fixing holes:

- For fixing to interface plate: Four holes ø14,5mm (1) at pitch circle diameter 400mm.

Dimensions of plate: 600x600x50mm

Fig. 10:



Supplied components:

- 4 pieces M10x325mm threaded rods DIN 975
- 4 pieces M10 special nuts
- 4 pieces M10 hexagon nuts DIN 934
- 4 pieces plain washers
- 8 pieces sheet metal screw
- 3,5 meters “U” type molded strip

3.7. Options For Ceiling Fixations

There are three possible ways to carry out the main ceiling fixation of the pendant arms.

- The ceiling fixation is suspended from the ceiling structure, using a counter-plate and threaded through rods.
- The ceiling fixation is secured in the ceiling structure with heavy-load anchors.
- The ceiling fixation is connected from the ceiling substructure using bolts.

The interface plate for the direct accommodation of the pendant arms and supply connections is used differently depending on the type of ceiling structure.

A falling plate can lead to severe injury. No person should under the interface plate during installation.

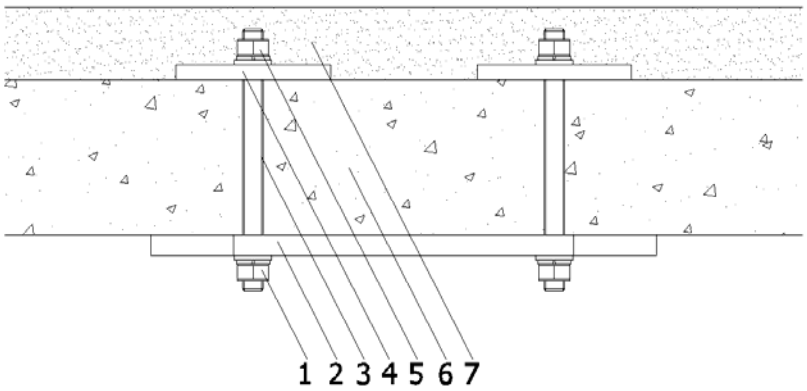
When the ceiling anchorage plate or interface plate is being fixed to the ceiling, it has to be positioned correctly for the head and foot of the ICU-bed, the supply apparatus and the cut of the operating theatre.

3.7.1. Fixation On The Ceiling With Counter-Plate Sets

Fixation with counter-plates is suited for installation during the shell phase, on completion of the concrete ceiling and to subsequent installation in existing ceiling structures.

- The general safety instructions are given in Section 3.1
- The length of the threaded bolts used depends on the thickness of the ceiling.
- In the case of a planned fixation of the pendant arms directly onto the raw ceiling, the thickness of the plaster coat or a similar ceiling covering must be included in the calculation with the clearance dimension of the bolt.
- The counter-plates must be completely covered by any subsequent screed or impact sound insulation.
- If counter-plates, threaded bolts and washers are provided at the mains only anti-corrosive components may be used.
- The threaded bolts must correspond to at least Property Class 8.8.
- For this purpose, Nassetti offers the counter-plate set consisting of 4 pieces M20 threaded rods, plates with mounting devices.

Fig. 11:



1) Plain washers, spring washers and nuts
2) Interface or ceiling anchorage plate
3) Threaded rods
4) Counter-plate
5) Plain washers, spring washers and nuts
6) Concrete ceiling
7) Floor screed

Procedure:

a- Mark the drill holes for the interface or ceiling anchorage plate (2) and drill with a diameter of 22mm.
b- Screw plain washers, spring washers and hexagon nuts (5) onto the M20 threaded bolts (3).
c- Position the counter-plate (4) on the ceiling (6) and insert the prepared threaded bolts from above through the ceiling holes.
d- Screw down the interface or ceiling anchorage plate and counter plate set using the M20 threaded bolts, plain washers, spring washers and hexagon nuts (1) and tighten hexagon nuts with a torque of 60Nm using a torque wrench.

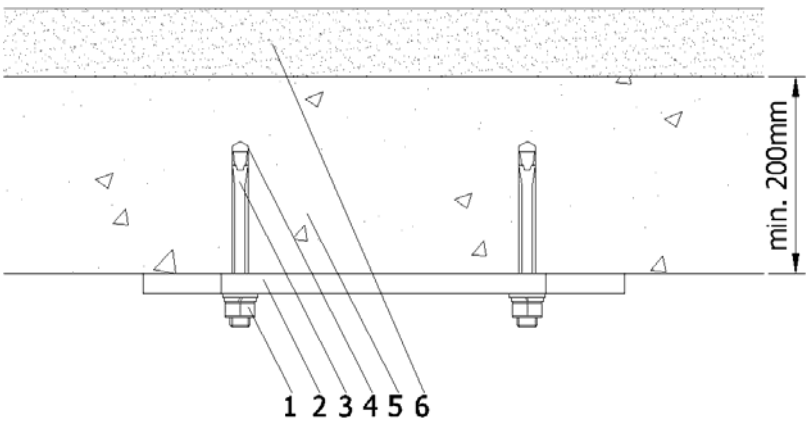
If the reinforcement is drilled when the bolt holes are being drilled, please contact the structural engineer to see if the damage affects safety.

3.7.2. Fixation On The Ceiling With Heavy-Load Anchors

If fixation using the counter-plate set is not possible for structural reasons, heavy-load anchors may be used with due consideration for the conditions listed below. There may be differences from the following information in some countries, and then the appropriate national regulations must be observed.

- The general safety instructions are given in Section 3.1
- People are at risk if the ceiling fixation fails. The anchoring components are, therefore, subject to detailed safety regulations set down in the building inspectorate approvals. These approvals contain precise details on how to carry out the design and installation of heavy-load anchor fixing systems, permitted loads and general structural conditions.
- Only heavy-load anchors approved for use in the zone subject to tensile forces must be used. In consideration of the safety conditions, we recommend the HILTI HST-M20/30 through-anchor for BRIDGE pendant arms. This can be obtained in specialist shops.
- For the installation of the interface plate or ceiling anchorage plate with heavy-load anchors, a so-called "individual license" must be obtained from the appropriate regional building authorities. The approvals are provided by the manufacturers concerned.
- Carry out the fixation in accordance with the approved regulations or with the regulations of the building authorities responsible for approval. Under these regulations, the site manager or his representative must record the installation of the heavy-load anchors.
- In the case of a planned fixation of the pendant arms directly onto the raw ceiling, the thickness of the plaster coat or a similar ceiling covering must be included in the calculation with the clearance dimension of the self-supporting bolts.

Fig. 12:



1) Plain washers, spring washers and nuts
2) Interface or ceiling anchorage plate
3) Anchor
4) Drilling hole
5) Concrete ceiling
6) Floor screed

Procedure:

a- Check the general conditions.
b- Mark the drill holes for the interface or ceiling anchorage plate (2) and drill with a diameter of 20mm up to 140mm deep.
c- Insert anchors into the holes
d- Screw down the interface or ceiling anchorage plate using the plain washers, spring washers and M20 hexagon nuts (1) and tighten hexagon nuts with a torque of 60Nm using a torque wrench.

When using heavy-load anchors, pay attention to the technical instructions from the anchor manufacturer.

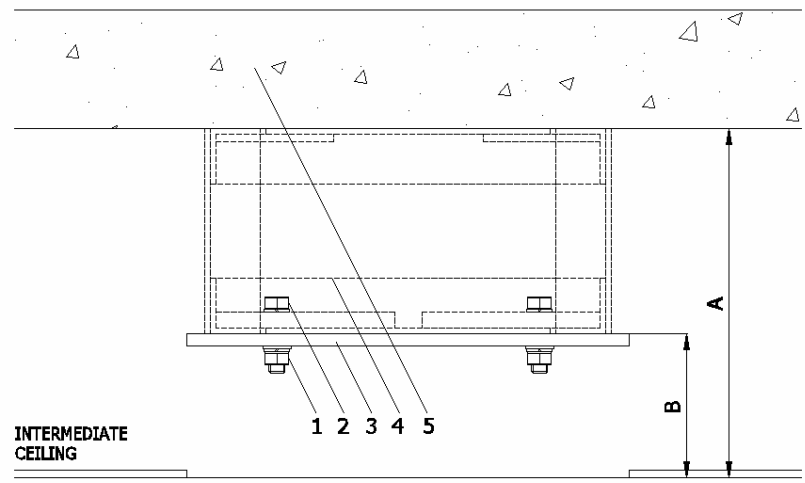
3.7.3. Fixation On The Ceiling Substructure With Bolts

For very high ceilings, a ceiling substructure must be installed on site. The necessary planning must be undertaken in consultation with the building management, structural engineers and Nassetti.

When ordering, state the dimension (A), the distance between the lower edge of the ceiling substructure and the lower edge of the raw ceiling.

- The general safety notes are given in Section 3.1
- People are endangered if the ceiling fixation fails! The Installation of a ceiling substructure is subject to approval under building regulations.
- A static certificate and the regulatory approval must be obtained prior to installation of the ceiling fixation.
- The bolts must correspond to at least Property Class 8.8.
- For this purpose, Nassetti offers the 4 pieces M20x80mm bolts.
- The ceiling substructure must contain the holes for the interface plate to be fitted.

Fig. 13:



1) Plain washers, spring washers and nuts
2) M20 Bolts and spring washer
3) Interface plate
4) Ceiling substructure
5) Concrete ceiling

Procedure:

a- Insert the M20 bolts and spring washers from above through the holes onto the ceiling substructure.
b- Screw down the interface plate using the plain washers, spring washers and hexagon nuts (1) and tighten hexagon nuts with a torque of 60Nm using a torque wrench.

3.8. Preparation For Installation Of The Ceiling Suspension Systems

The maximum distance between load-bearing and intermediate ceilings, which can be bridged by the ceiling suspension system for intermediate ceilings is 960mm. The spacer tubes and the threaded rods are cut to the required length on site.

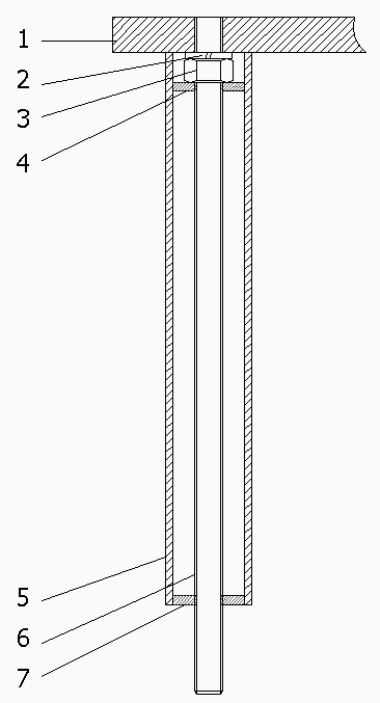
Procedure:

a- Screw the upper plastic centering part for the tubes (4) and the M16 hexagon nut (3) on the threaded rods (6), and put on the spring washer (2).
b- Screw into the ceiling anchorage plate (1) and tighten 60Nm, using a torque wrench.
c- Screw the lower plastic centering part for the tubes (7) on the threaded roads (6)
d- Insert the tubes.

The spacer tubes maintain the spacing and, at the same time, act as a mounting surface for ceiling anchorage plate and interface plate. The interface plate on the spacer tube must be flat and right-angled. All spacer tubes must be cut to the same length, otherwise it is impossible to install the pendant arms to be stable. The ceiling anchorage plate is mounted on the raw ceiling; threaded rods that are not completely driven home may cause the pendant arm to collapse.

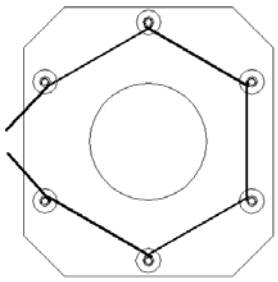
The tubes will freely fall until the interface plate is fixed to the ceiling suspension system for intermediate ceiling. Therefore, the tubes must be secured by a copper or steel wire, by wrapping the wire around (Fig.15) one threaded rod and then moving on to the other repeating the same wrapping, as the tubes are inserted in place.

Fig. 14:



1) Ceiling anchorage plate
2) Spring washer
3) M16 hexagon nut
4) Plastic centering parts for the tube
5) ø 48.4mm spacer tube
6) M16 threaded rod
7) Plastic centering parts for the tube

Fig. 15:



3.9. Installation Of Interface Plate Onto The Ceiling Suspension System For Intermediate Ceiling

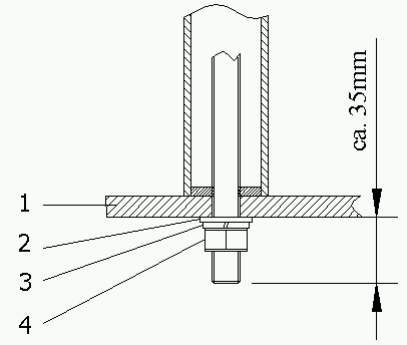
When installing the interface plate, the correct positioning of the plate (upper and lower sides) in room should be observed.

Procedure:

a- Screw the interface plate (1) with the plain washer (2), spring washer (3) and M16 hexagon nut (4) onto the ceiling interface plate.
b- Unwrap the wiring and tighten 60Nm using a torque wrench.

To retain adequate space for the supply connections, the threaded bolts must not protrude beyond 35mm from the interface plate after assembly of the ceiling suspension system for intermediate ceilings.

Fig. 16:



1) Interface plate
2) Plain washer
3) Spring washer
4) M16 hexagon nut

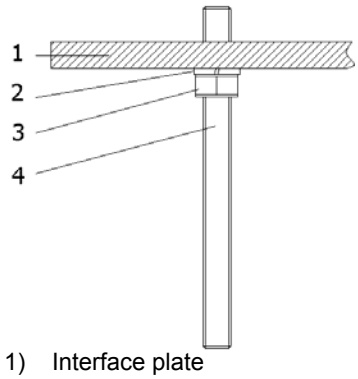
3.10. Preparation For Installation Of The Carrying Arms

Procedure:

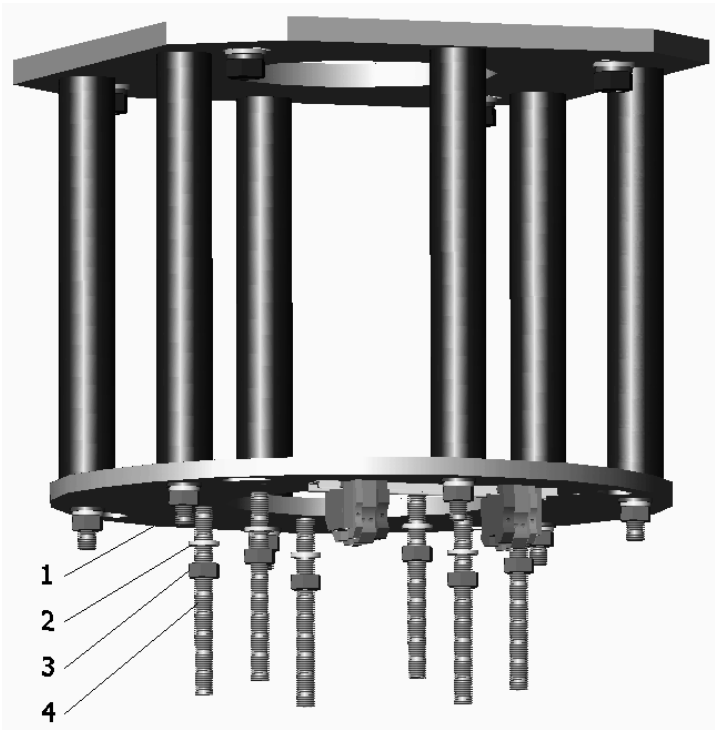
a- Screw the M16 hexagon nut (3) on the threaded rod (4), and put on the spring washer (2).
b- Screw the threaded rods into the interface plate (1) and tighten 60Nm, using a torque wrench.

For reasons of stability, the threaded rods may not exceed a maximum length of 205mm / 315mm. If the interface plate is mounted on the bare ceiling, threaded rods that are not completely driven home may cause the pendant arm to collapse.

Fig. 17:



1) Interface plate
2) Spring washer
3) M16 hexagon nut
4) M16x205 / 315mm threaded rod



4. Carrying Arms

4.1. Installation Of The Upper Joint Of The Single Arm Type Pendant Arms

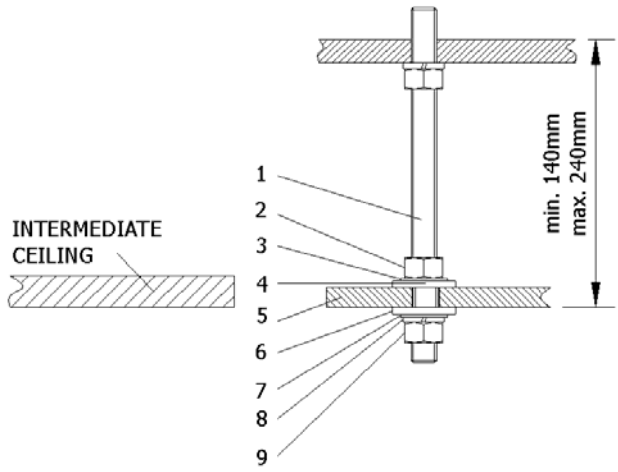
Procedure:

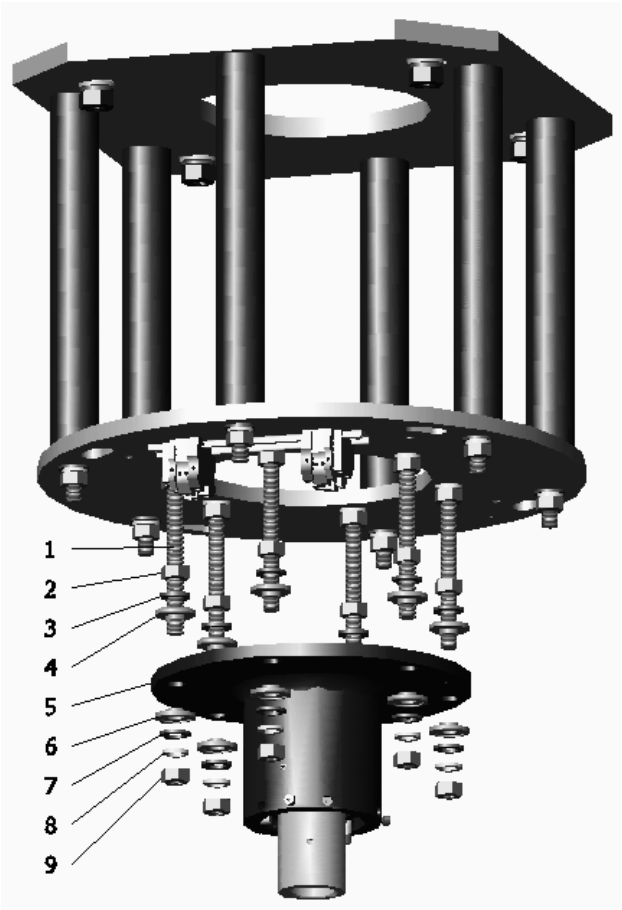
a- Screw the hexagon nut (2) onto the threaded rods (1), and then attach the plain washer (3) and the plastic insulating washer (4), onto the threaded rods (1), using masking tape.
b- Fit the upper joint (5) onto the threaded bolts (1) and secure with two hexagon nuts.
c- Fit the plastic insulating washers (6), plain washers (7), spring washer (8) and M16 hexagon nuts (9) onto the threaded bolts.
d- Align the upper joint (5) flush with the intermediate ceiling and lightly tighten the M16 hexagon nuts (9).
e- Align the upper joint (5) horizontally, using a water level, by adjusting the lower M16 hexagon nuts.
f- Tighten the upper M16 hexagon nuts (2), in pairs, using a spanner.
g- Tighten the lower M16 hexagon nuts (9) to 60Nm, using a torque wrench.
h- Check that the upper joint is vertically aligned.

Exact horizontal alignment is of great importance in securing freedom of movement of the assembly and secure positioning of the pendant systems.

The distance between the intermediate ceiling and the interface plate must not be less than the minimum distance and more than the maximum distance. In addition, the lower edge of the upper joint flange must be same leveling of the intermediate ceiling lower surface. When installing the upper joints, attention must be paid to the alignment in the room (head and foot side / dry and wet side).

Fig. 18:





1) M16x315mm threaded rod
2) M16 hexagon nut
3) Plain washer
4) Plastic insulating washer
5) Upper joint
6) Plastic insulating washer
7) Plain washer
8) Spring washer
9) M16 hexagon nut

4.2. Installation Of The Upper Joints Of The Double Arm Type Pendant Arms

Procedure:

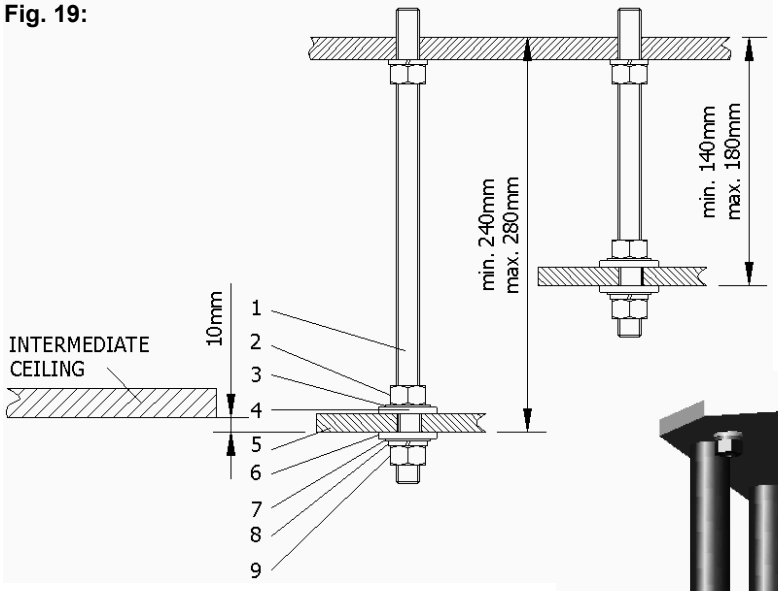
a- Screw the hexagon nut (2) onto the threaded rods (1), and then attach the plain washer (3) and the plastic insulating washer (4), onto the threaded rods (1), using masking tape.
b- Fit the upper joint (5) onto the threaded bolts (1) and secure with two hexagon nuts.
c- Fit the plastic insulating washers (6), plain washers (7), spring washer (8) and M16 hexagon nuts (9) onto the threaded bolts.
d- Align the upper joint (5) flush with the intermediate ceiling and lightly tighten the M16 hexagon nuts (9).
e- Align the upper joint (5) horizontally, using a spirit level, by adjusting the lower M16 hexagon nuts.
f- Tighten the upper M16 hexagon nuts (2), in pairs, using a spanner.
g- Tighten the lower M16 hexagon nuts (9) to 60Nm, using a torque wrench.
h- Check that the upper joint is vertically aligned.

Pendant Arm

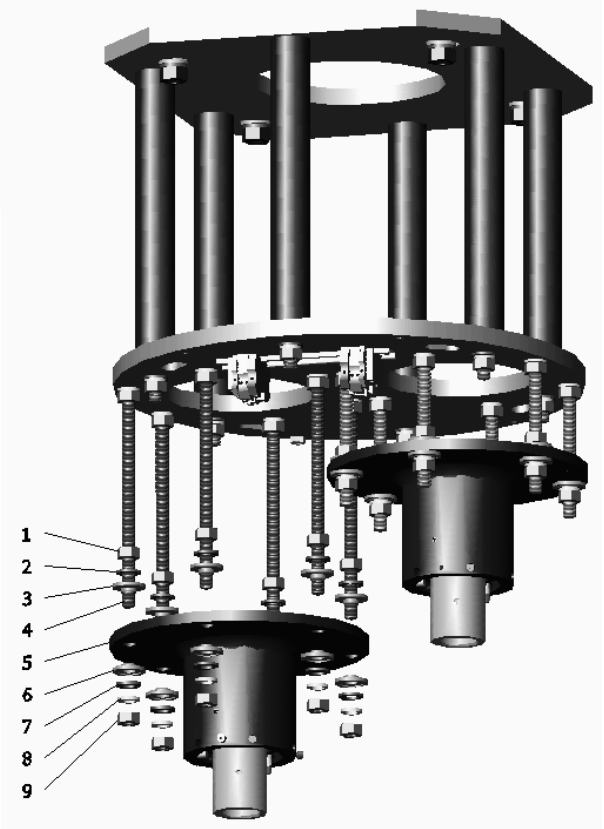
Exact horizontal alignment is of great importance in securing freedom of movement of the assembly and secure positioning of the pendant systems.

The distance between the intermediate ceiling and the interface plate must not be less than the minimum distance and more than the maximum distance. In addition, the distance between the lower edge of the upper joint flange (near to the floor) and the intermediate ceiling lower surface must be 10mm. Install the first upper joint on the short threaded rods. When installing the upper joints, attention must be paid to the alignment in the room (head and foot side / dry and wet side).

Fig. 19:



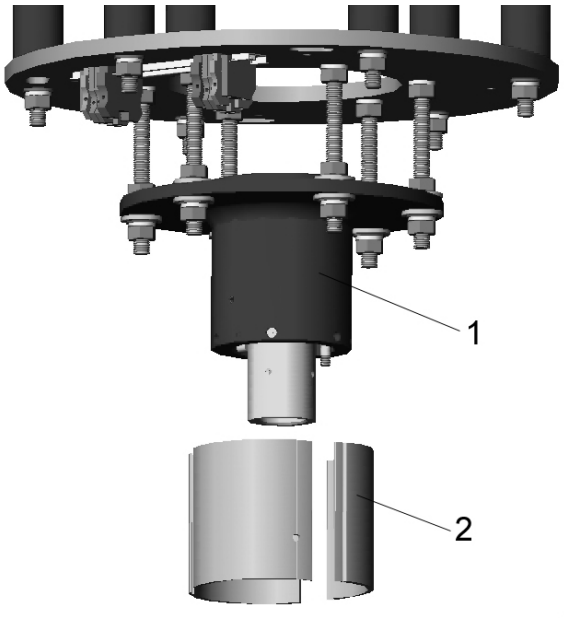
1) M16x315mm threaded rod
2) M16 hexagon nut
3) Plain washer
4) Plastic insulating washer
5) Upper joint
6) Plastic insulating washer
7) Plain washer
8) Spring washer
9) M16 hexagon nut

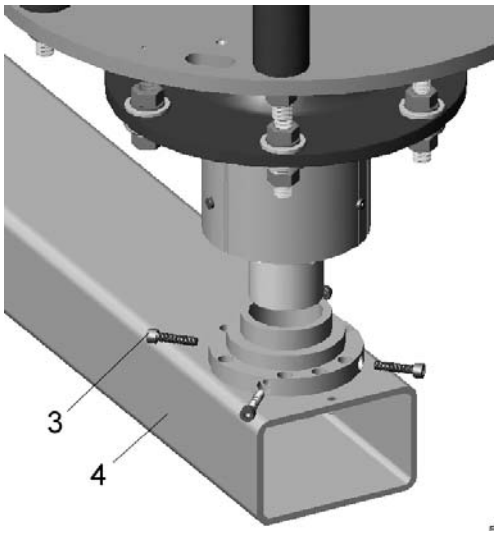


4.3. Installation Of The Carrying Arms Onto The Upper Joints
The single and double joint type carrying arm installations onto the upper joint are identical.

Procedure:
a- Insert the covers (2) onto the upper joint (1) and then attach the covers using masking tape.
b- Push the carrying arm (4) onto the upper joint (1) so that the threaded holes in the upper joint line up with the holes in the carrying arm flange.
c- Screw on with M8x35mm four hexagon socket head cap screws (3) and tighten equally to 25Nm, using a torque wrench

Fig. 20:





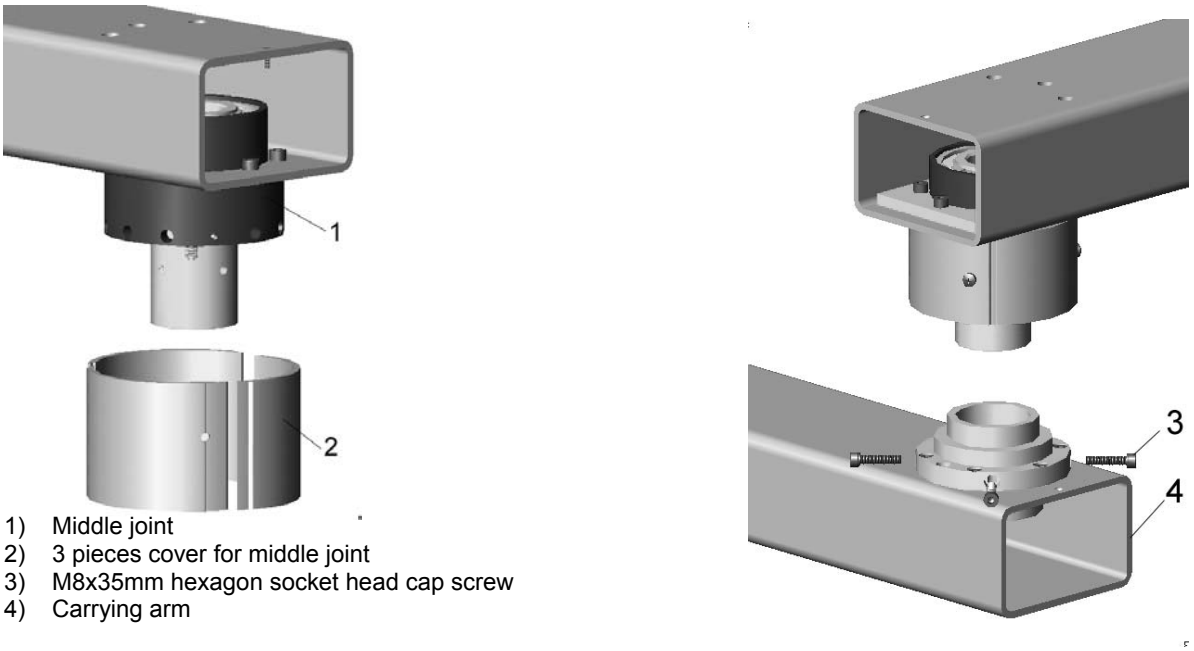
1) Upper joint
2) 3 pieces cover for upper joint
3) M8x35mm hexagon socket head cap screw
4) Carrying arm

4.4. Installation Of The Secondary Carrying Arms Onto The Middle Joints

Procedure:
a- Insert the covers (2) onto the middle joint (1) and then attach the covers using masking tape.
b- Push the carrying arm (4) onto the middle joint (1) so that the threaded holes in the middle joint line up with the holes in the carrying arm flange.
c- Screw on with M8x35mm four hexagon socket head cap screws (3) and tighten equally to 25Nm, using a torque wrench.

These installations are required ONLY for double joint type carrying arms.

Fig. 21:

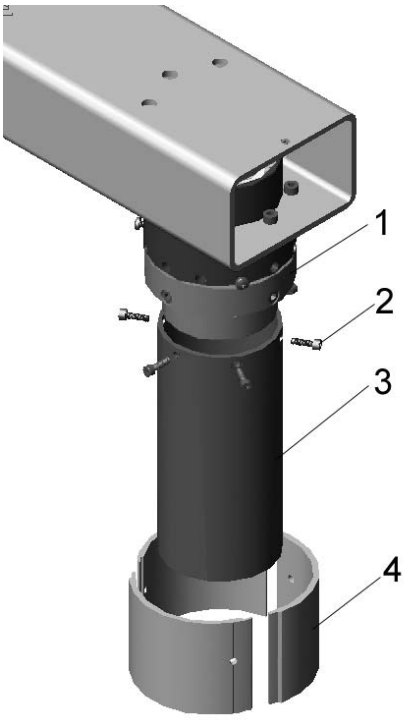


1) Middle joint
2) 3 pieces cover for middle joint
3) M8x35mm hexagon socket head cap screw
4) Carrying arm

4.5. Installation Of The Columns Onto The Lower Joints

The single and double joint type carrying arm installations onto the lower joint are identical. The column supplied depends on the room height and the console that is to be used.

Fig. 22:



Procedure:

a- Push the column (3) onto the lower joint (1) so that the threaded holes in the lower joint line up with the holes in the column.
b- Screw on with M6x20mm six hexagon socket head cap screws (2) and tighten equally to 25Nm, using a torque wrench.
c- Insert the cover (4) onto the lower joint (1) and then attach the cover using masking tape.

1) Lower joint
2) M6x20mm hexagon socket head cap screw
3) Column
4) Cover for lower joint

On double pendant arm types, always install the short column on the carrying arm in the lower position, so that later, the consoles will be at the same height.

5. Consoles

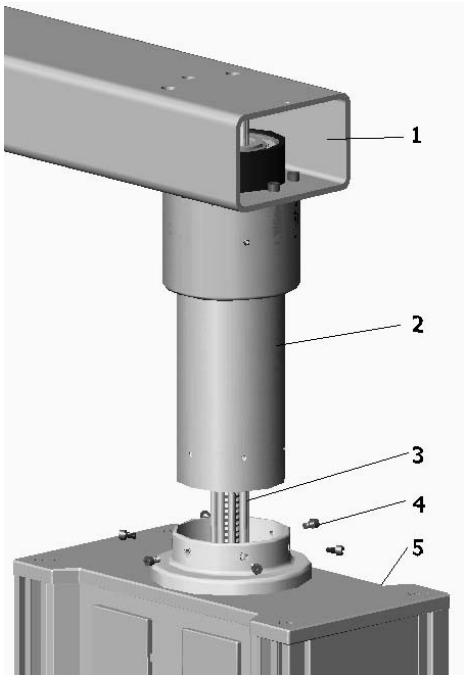
5.1. Installation Of The Consoles Onto The Columns

The standard console is available in three different lengths 435mm, 631mm, 827mm and is equipped as ordered (shelves and infusion carrier)

Procedure:

a- Lift up the console (5) and take the supply wires and gas hoses (3) through the column (2) as far as the opening in the carrying arm (1).
b- Put the console (5) onto the column (2) so that the threaded holes in the column line up with the holes in the console flange.
c- Screw on with M6x10mm six hexagon socket head cap screws (4) and tighten equally to 13Nm, using a torque wrench.
d- Take the supply wires and gas hoses (3) up to the interface plate.

Fig. 23:



Damaged supply wires and gas hoses can make the pendant arm live or gases can escape. Insert the supply wires and gas hoses carefully and avoid twisting. Do not get kinks in the gas hoses.

1) Opening in carrying arm
2) Column
3) Supply wires and gas hoses
4) M6x10mm hexagon socket head cap screw
5) Console

6. Shelves

The standard shelf is available in two different types as with or without drawer.

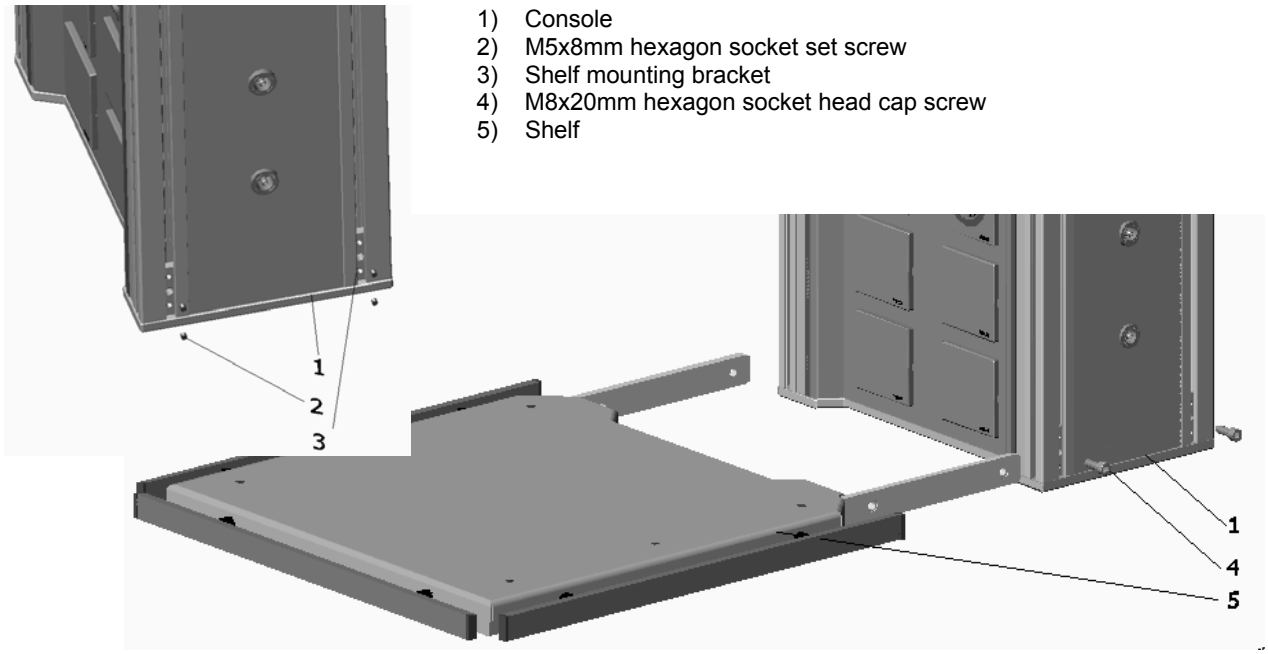
6.1. Installation Of The Shelves Onto The Consoles

Procedure:

a- Putting different end appliances on the standard console (1) may make it necessary to reposition the shelves (5). Loosen the eight hexagon socket set screws (2) on the four shelf mounting brackets (3).
b- Reposition the shelf mounting brackets (3) as desired but leveling on both sides and screw on again.
c- Push the shelf (5) onto shelf mounting brackets (3) and screw on with M8x20mm four hexagon socket head cap screws (4) and tighten.

Onto the 435mm console max. 2 shelves, onto the 631mm console max. 3 shelves and onto the 827mm console max. 4 shelves can be installed.
Maximum carrying capacity per shelf (without drawer): 70 kg
Maximum carrying capacity per shelf (with drawer): 60 kg
Maximum carrying capacity of drawer and side rails: 10 kg

Fig. 24:



1) Console
2) M5x8mm hexagon socket set screw
3) Shelf mounting bracket
4) M8x20mm hexagon socket head cap screw
5) Shelf

7. I.V. / Infusion Pump Holders

The standard I.V. / infusion pump holder is available in two different types as single or double joint.

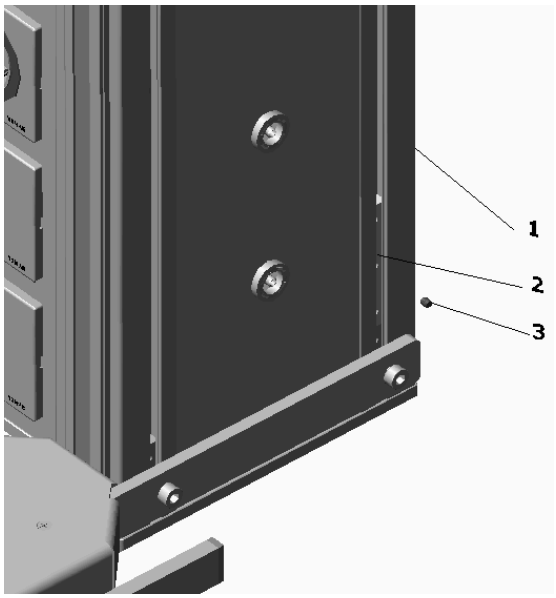
7.1. Installation Of The I.V. / Infusion Pump Holders Onto The Consoles

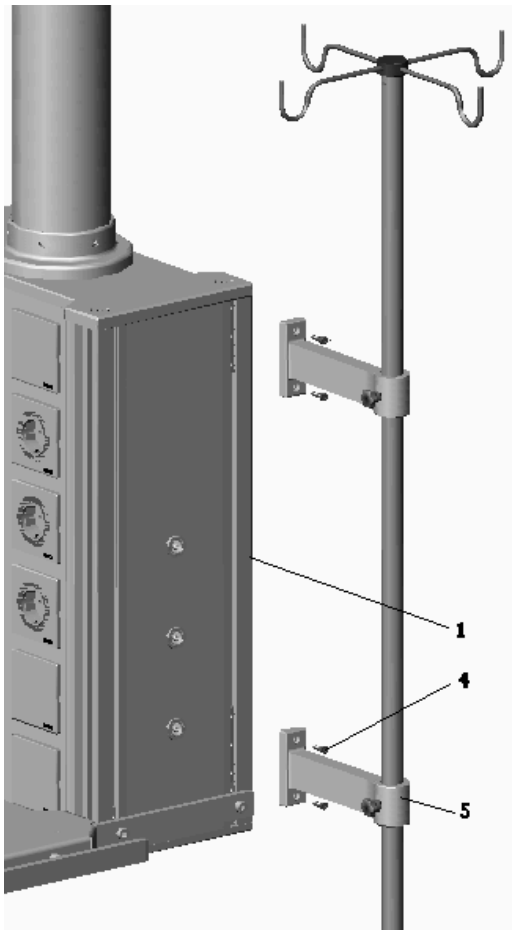
Procedure:

a- Putting different end appliances on the standard console and the infusion console (1) may make it necessary to adjust the position of the I.V. / infusion pump holder carrying arms (5). Loosen the hexagon socket set screws (3) on the mounting brackets (2).
b- Reposition the mounting brackets (2) and screw on again.
c- Place the I.V. / infusion pump holder carrying arms (5) onto the mounting brackets (2) and screw on with M5x20mm four hexagon socket head cap screws (4) and tighten.

Maximum two I.V. / Infusion pumps holder can be installed onto the console.
Maximum carrying capacity per I.V. / Infusion pumps holder: 50 kg

Fig. 25:



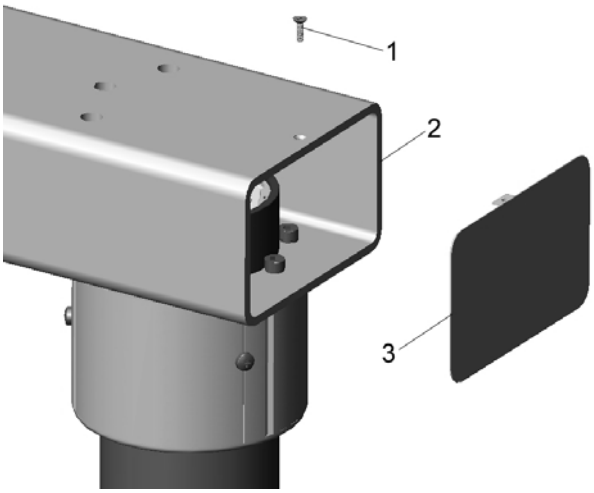


1) Console
2) Mounting bracket
3) M5x8mm hexagon socket set screw
4) M8x20mm hexagon socket head cap screw
5) I.V. / infusion pump holder carrying arm

8. Covers

8.1. Installation Of The Opening Covers Onto The Carrying Arms

Fig. 26:



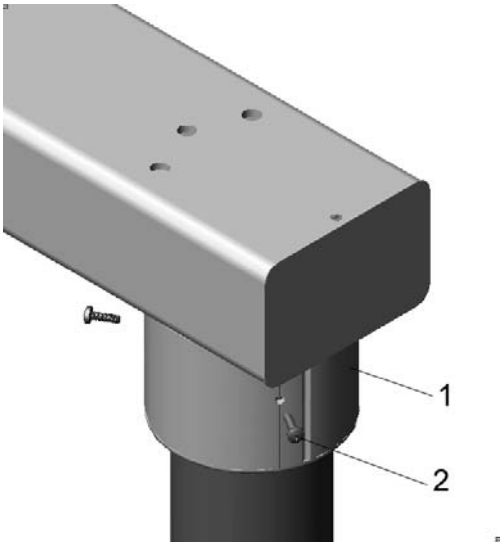
Procedure:

a- Place the opening cover (3) onto the carrying arm (2)
b- Screw on with M4x15mm countersunk head screws (1) and tighten.

1) M4x15mm countersunk head screw
2) Carrying arm
3) Opening cover

8.2. Fixation Of The Covers Onto The Lower Joints

Fig. 27:



Procedure:

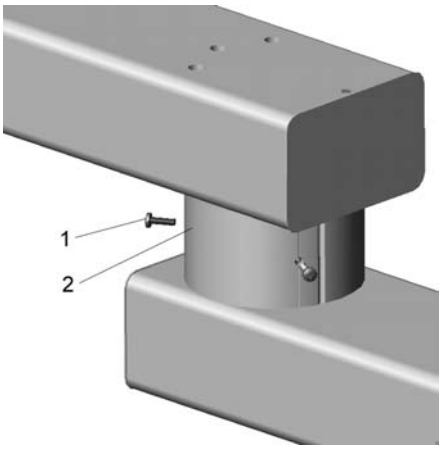
a- Place the previously installed cover (1) in correct position onto the lower joint

b- Screw on with three M6x10mm button head cap screws (2) and tighten.

1) Cover for lower joint
2) M6x10mm button head cap screws

8.3. Fixation Of The Covers Onto The Middle Joints

Fig. 28:



Procedure:

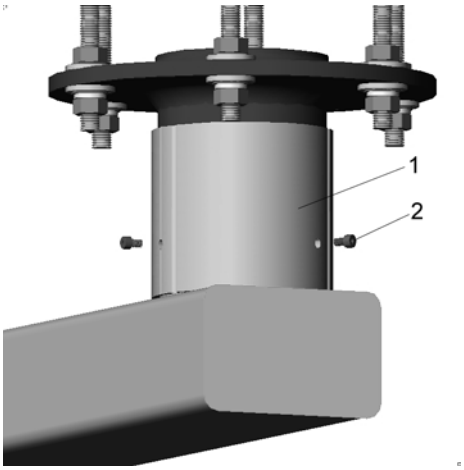
a- Place the previously installed first and second covers (2, 3) in correct position onto the middle joint

b- Screw on with three M6x10mm button head cap screws (1) and tighten.

1) M6x10mm button head cap screw
2) 3 pieces cover for middle joint

8.4. Fixation Of The Covers Onto The Upper Joints

Fig. 29:



Procedure:

a- Place the previously installed 3 pieces cover (1) in correct position onto the upper joint.

b- Screw on with three M6x10mm button head cap screws (2) and tighten.

1) 3 pieces cover for upper joint
2) M6x10mm button head cap screw

8.5. Intermediate Ceiling Opening Covers

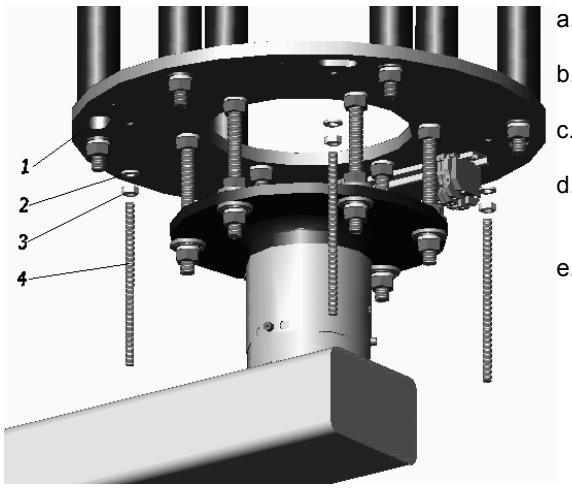
There must be an opening in the intermediate ceiling, kept free for the pendant arms. Maximum dimensions for the opening in the intermediate ceiling:

For single arm type pendant arms: 540mm
For double arm type pendant arms: 570mm

The ceiling anchorage plate must be positioned in the centre of the opening in the intermediate ceiling. The opening in the intermediate ceiling must not exceed the maximum dimension, depending on the pendant arms to be installed.

8.5.1. Installation Of The Single Arm Type Ceiling Opening Covers

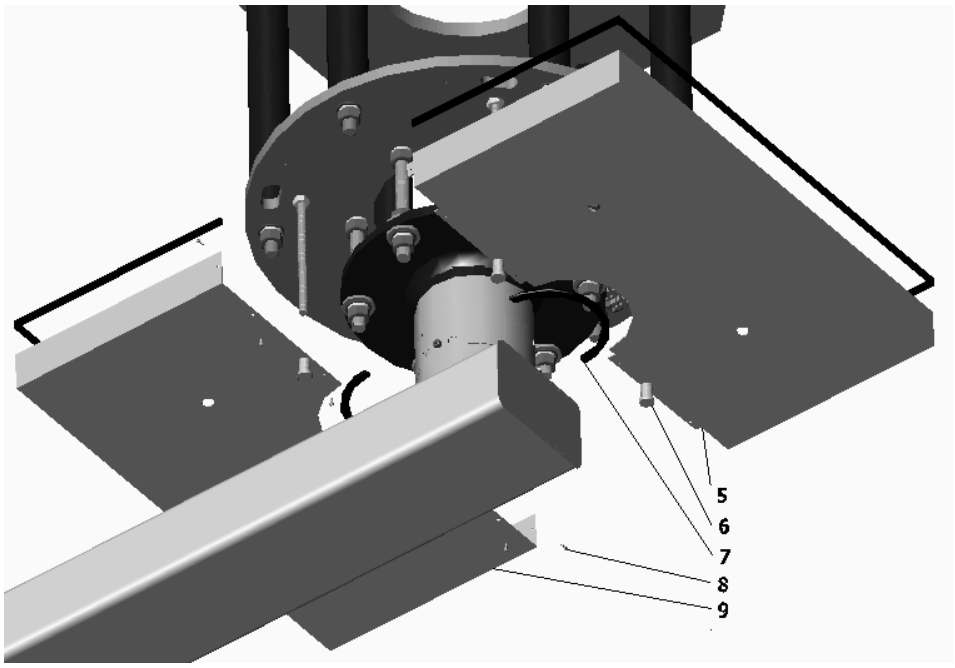
Fig. 30:



Procedure:

a. Screw the M10 hexagon nut (3) on the threaded rod (4), and put on the plain washer (2).
b. Screw the four threaded rods into the interface plate (1) and tighten.
c. Put the “U” type moulded strips (7) onto the edges of the ceiling opening cover halves (5, 9).
d. Put the ceiling opening cover halves (5, 9) onto the threaded rods (4) so that the two ceiling opening cover halves (5, 9) fit into each other and lie flush with the intermediate ceiling.
e. Screw on the ceiling opening cover halves (5,9) with the four M10 special nuts (6) onto the threaded rods (4) and then with the six sheet metal screw (8)

1) Interface plate
2) Plain washer
3) M10 Hexagon nut
4) M10x325mm threaded rod
5) Ceiling opening cover half
6) M10 special nut
7) “U” type molded strip
8) Sheet metal screw
9) Ceiling opening cover half

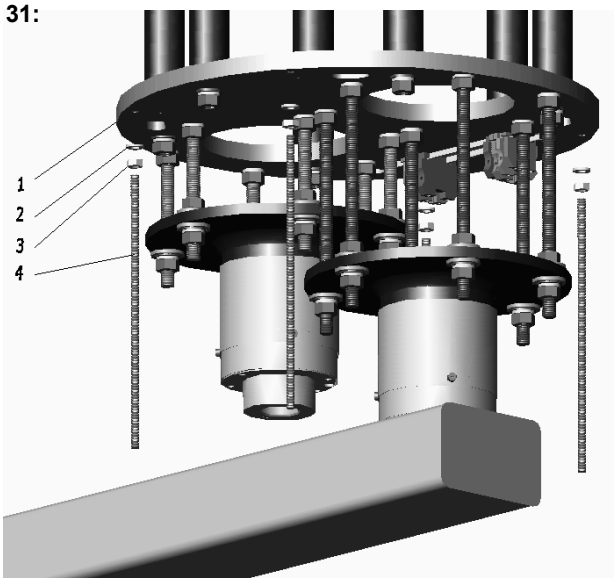


8.5.2. Installation Of The Double Arm Type Ceiling Opening Covers

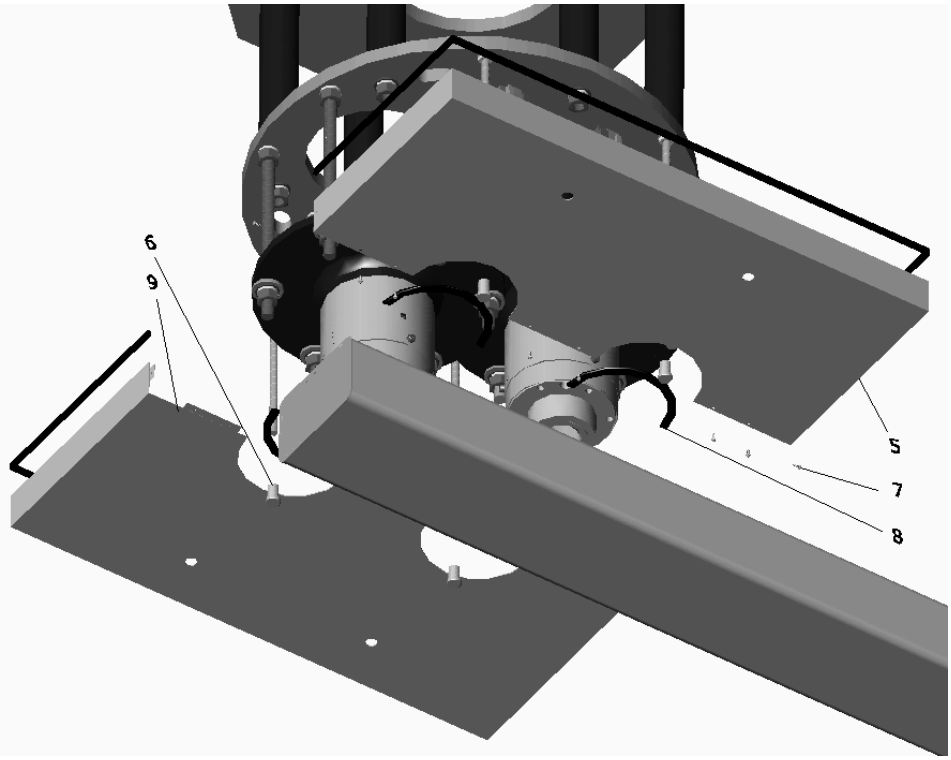
Procedure:

a. Screw the M10 hexagon nut (3) on the threaded rod (4), and put on the plain washer (2).
b. Screw the four threaded rods into the interface plate (1) and tighten.
c. Put the “U” type moulded strips (8) onto the edges of the ceiling opening cover halves (5, 9).
d. Put the ceiling opening cover halves (5, 9) onto the threaded rods (4) so that the two ceiling opening cover halves (5, 9) fit into each other and lie flush with the intermediate ceiling.
e. Screw on the ceiling opening cover halves (5,9) with the four M10 special nuts (6) onto the threaded rods (4) and then with the six sheet metal screw (7)

Fig. 31:



1) Interface plate
2) Plain washer
3) M10 Hexagon nut
4) M10x325mm threaded rod
5) Ceiling opening cover half
6) M10 special nut
7) Sheet metal screw
8) “U” type molded strip
9) Ceiling opening cover half



9. Setting Operations

This section describes the operations required to set additional rotational stop and the adjustment of the mechanical brakes. Rotation stop pins are supplied with the all joints.

9.1. Settings The Mechanical Breaks

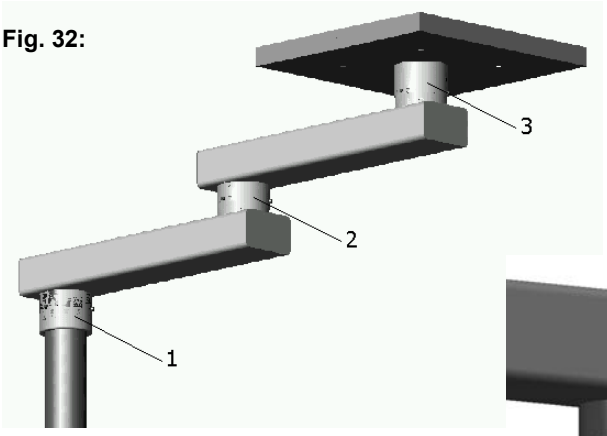
Procedure:

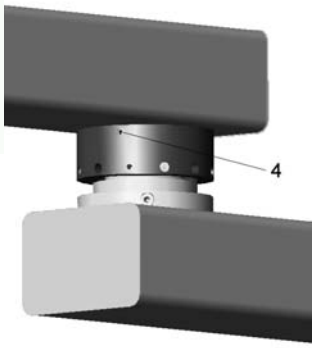
a- Switch off the power to the pendant arm and secure against the ceiling before switching power on again.
b- In every rotary joint, there is a brake screw (4). The brake screw (4) may be adjusted with a hexagon socket screw key.
c- For brake adjustment at lower joint (1), remove the three button head cap screws (6) of the cover; slide the cover down.
d- For brake adjustment at middle joint (2), remove the three button head cap screws (5) of the cover; demote the cover.
e- For brake adjustment at point upper joint (3), remove the button head cap screws (5) of the cover; demote the cover.
f- Set the brake screws (4) at all joints, from top to bottom, beginning at the upper joint (3).
g- Place cover at all joints and put the three button head cap screws (5) in place.

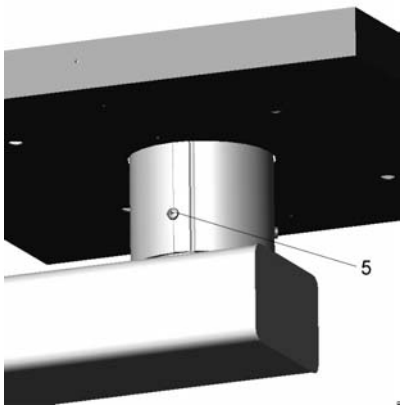
All brake screws are hexagon socket set screws; all other screws are fixing screws and must not be loosened. The power supply connections of the pendant arm are below the ceiling cover. If the ceiling cover is dismantled when setting the mechanical brakes, the pendant arm must have power switched off and be secured against the ceiling before being switched on again.

Adjust the brakes so that the pendant arm can be moved easily, yet will always remain in a set position.

Fig. 32:







1) Lower joint
2) Middle joint
3) Upper joint
4) M8x20mm hexagon socket set screw
5) M6x10mm button head cap screw

9.2. Settings The Rotation Stops

Procedure:

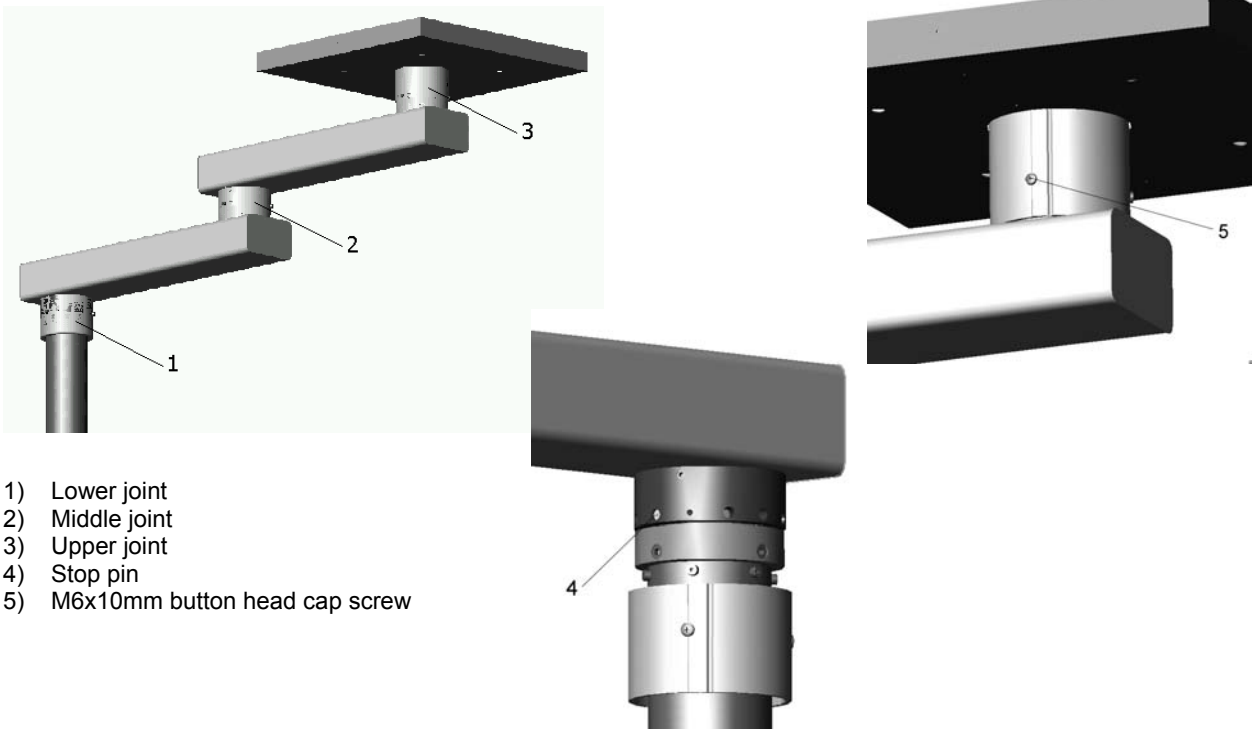
a- Switch off the power to the pendant arm and secure against the ceiling before switching power on again.
b- For stop adjustment at lower joint (1), remove the three button head cap screws (5) of the cover; slide the cover down.
c- For stop adjustment at middle joint (2) and upper joint (3), remove the three button head cap screws (5) of the cover; demote the cover.
d- Remove the stop pins (4), insert at the desired positions
e- Place cover at all joints and put cover connection screws (5) in place.

The power supply connections of the pendant arm are below the ceiling cover. If the ceiling cover is dismantled when setting the rotation stops, the pendant arm must have power switched off and be secured against the ceiling before being switched on again.

At least one stop pin needs to be fitted in every case, in order to prevent the internal supply wires and gas hoses being twisted off.

The stops of the pendant arm can be set at 30 degree intervals at all joints. A smaller stop limitation may be achieved by inserting second stop pin.

Fig. 33:



1) Lower joint
2) Middle joint
3) Upper joint
4) Stop pin
5) M6x10mm button head cap screw

10. Electrical Installations

10.1. Specifications For The Mains Electrical Installation / Equi-Potential Pin Laying With Strain Relief

The BRIDGE pendant arms are designed for a voltage supply of 230V-240V; 110V-120V units are also available upon special request. The power connections are to be laid at the mains up to the interface plate. In addition, the earth connections are to be laid to the terminals of the interface plates.

An interface for data connections is to be planned at the mains.
The distance between the interface for data connections and electrical supply connections (230-240V) is calculated from the thickness of the data connection covers plus a safety margin greater than 50mm. If the BRIDGE pendant arms contain empty tubes for the introduction of supply connections (e.g. code blue connections) at the mains, it is to be checked that these connections are flexible enough, the pendant arms having several possible movable joints.

- Planning, execution and testing of the electrical installation must be carried out at the mains by specialist electro-planners and approved specialist electrical companies.
- The electrical installations in the room concerned must meet the applicable national specifications. The number of electrical circuits depends on the design of the pendant arms specific to the customer. If the customer requires several electrical circuits, these must be taken into account on the interface plate.
- Multi-core connections must be provided with end sleeves for the strands.

10.2. Laying The Electrical Connections

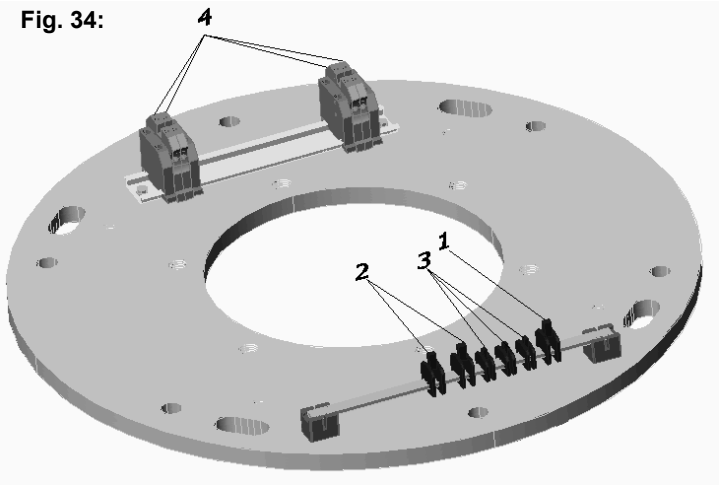
10.2.1. Laying The Electrical Connections For Single Arm Type Pendant Arms

PA / PE terminal unit insulated 3 earth leads with 4mm², 1 earth lead with 16mm² and 2 earth leads with 10mm² brought together for circuits and pendant arms:

- At the mains, 1x16mm² for complete pendant arms (1).
- On the appliance, 2x10mm² for socket circuits (2), 2x4mm² for carrying arms (3) and 1x4mm² for upper joint (3).

High voltage terminal block, insulated, 240 V/4-pole (4), labeled from 1-4 for 2 circuits of max. 6 sockets each, taking up to 16A per circuit. Lead cross section is 2.5mm².

Fig. 34:



1) 16mm² earthing terminal
2) 10mm² earthing terminal
3) 4mm² earthing terminal
4) 2.5mm² high voltage terminal

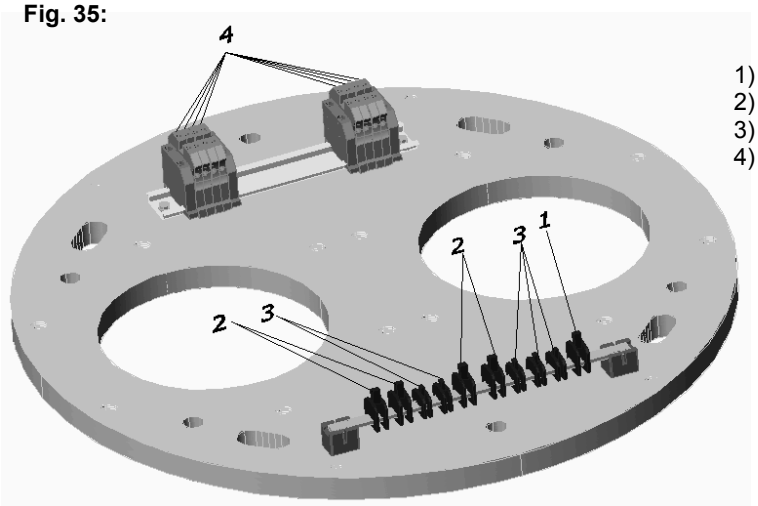
10.2.2. Laying The Electrical Connections For Double Arm Type Pendant Arms

PA / PE terminal unit insulated 5 earth leads with max. 4mm² and 5 earth leads with max. 16mm² brought together for circuits and pendant arms:

- At the mains, 1x16mm² for complete pendant arms (1).
- On the appliance, 4x10mm² for socket circuits (2), 3x4mm² for carrying arms (3) and 2x4mm² for upper joints (3).

High voltage terminal block, insulated, 240 V/4-pole (8), labeled from 1-8 for max. 4 circuits of 6 sockets each, taking up to 16A per circuit. Lead cross sections range from 2.5mm² to max. 10mm².

Fig. 35:



1) 16mm² earthing terminal
2) 10mm² earthing terminal
3) 4mm² earthing terminal
4) 2.5mm² high voltage terminal

10.3. Earthing The Apparatus

If appliance is not earthed, the pendant system may become live if the insulation fails. To avoid the danger of electric shock, always earth the appliance.

10.3.1. Earthing The Consoles

Procedure:

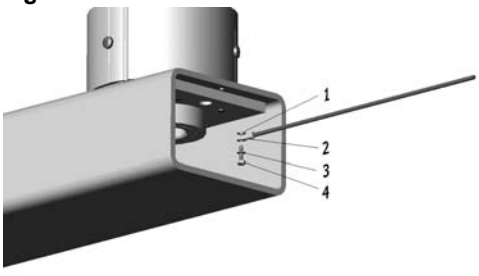
a- Cut the pre fitted 10mm² green/yellow earth leads of the console to length.
b- Fix the earth leads onto the terminal 10mm² (2) (Fig. 34, 35) of the earthing terminal block on the interface plate.

10.3.2. Earthing The Carrying Arms

Procedure:

a- Cut to length the 4mm² PE connection lead supplied.
b- Remove the insulation from the cable and put on the supplied cable shoe (2).
c- Place the cable shoe (2) between the two toothed washers (1, 3) and screw the M4x10mm hexagon head screw (4) onto the carrying arm.
d- Take the 4mm² PE connection lead and screw onto the earthing terminal block of the interface plate.
e- Repeat the procedure for all carrying arm.

Fig. 36:



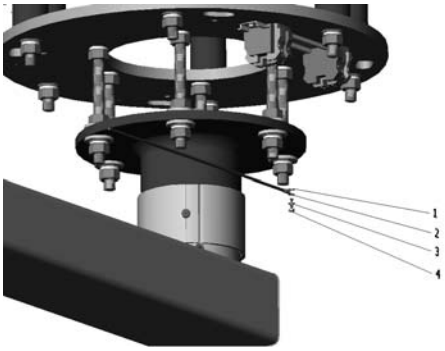
1) Toothed washer
2) Cable shoe
3) Toothed washer
4) M4x10mm hexagon head screw

10.3.3. Earthing The Upper Joints

Procedure:

a- Cut to length the 4mm² PE connection lead supplied.
b- Remove the insulation from the cable and put on the supplied cable shoe (2).
c- Place the cable shoe (2) between the two toothed washers (1, 3) and screw the M4x10mm hexagon head screw (4) onto the carrying arm.
d- Take the 4mm² PE connection lead and screw onto the earthing terminal block of the interface plate.
e- Repeat the procedure for other upper joint (double type pendant arm).

Fig. 37:



1) Toothed washer
2) Cable shoe
3) Toothed washer
4) M4x10mm hexagon head screw

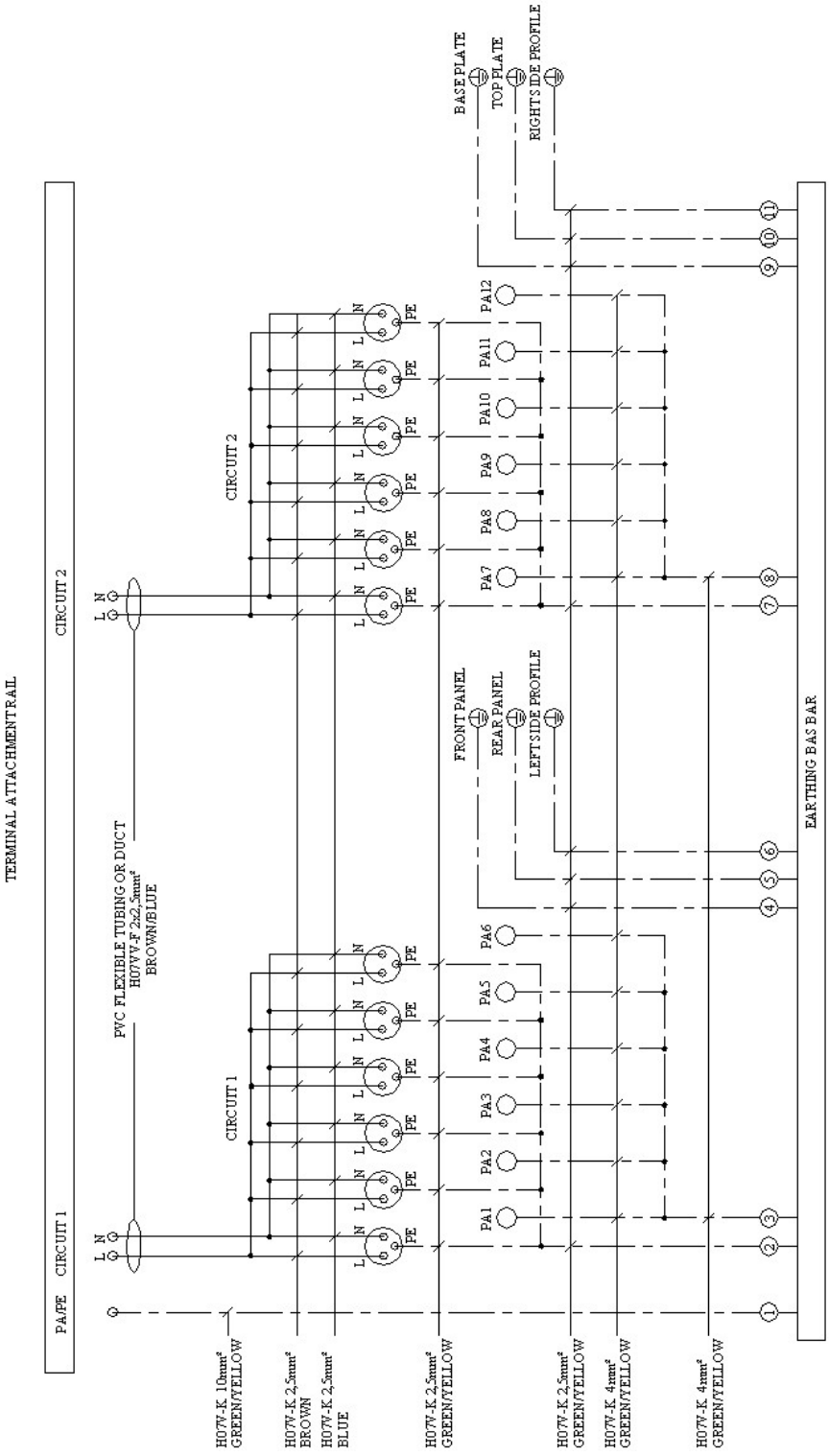
10.4. Power Supply

Procedure:

Connect the supply leads to the terminal block (2) (Fig. 34, 35) of the interface plate in accordance with the wiring plan.

The electrical connection of the pendant arm may only be carried out by an approved electrical installer. Multi-core mains cables must be provided wit strand sleeves.

10.5. Electrical Wiring Diagram Per Console



11. Gas Installations

Adaptor fittings (from O.D.10mm copper pipe to hose) are provided for compressed gases and vacuum, O.D.16mm connection pipes are used for exhaust gas of compressed air 8bar and anaesthetic gas evacuation.

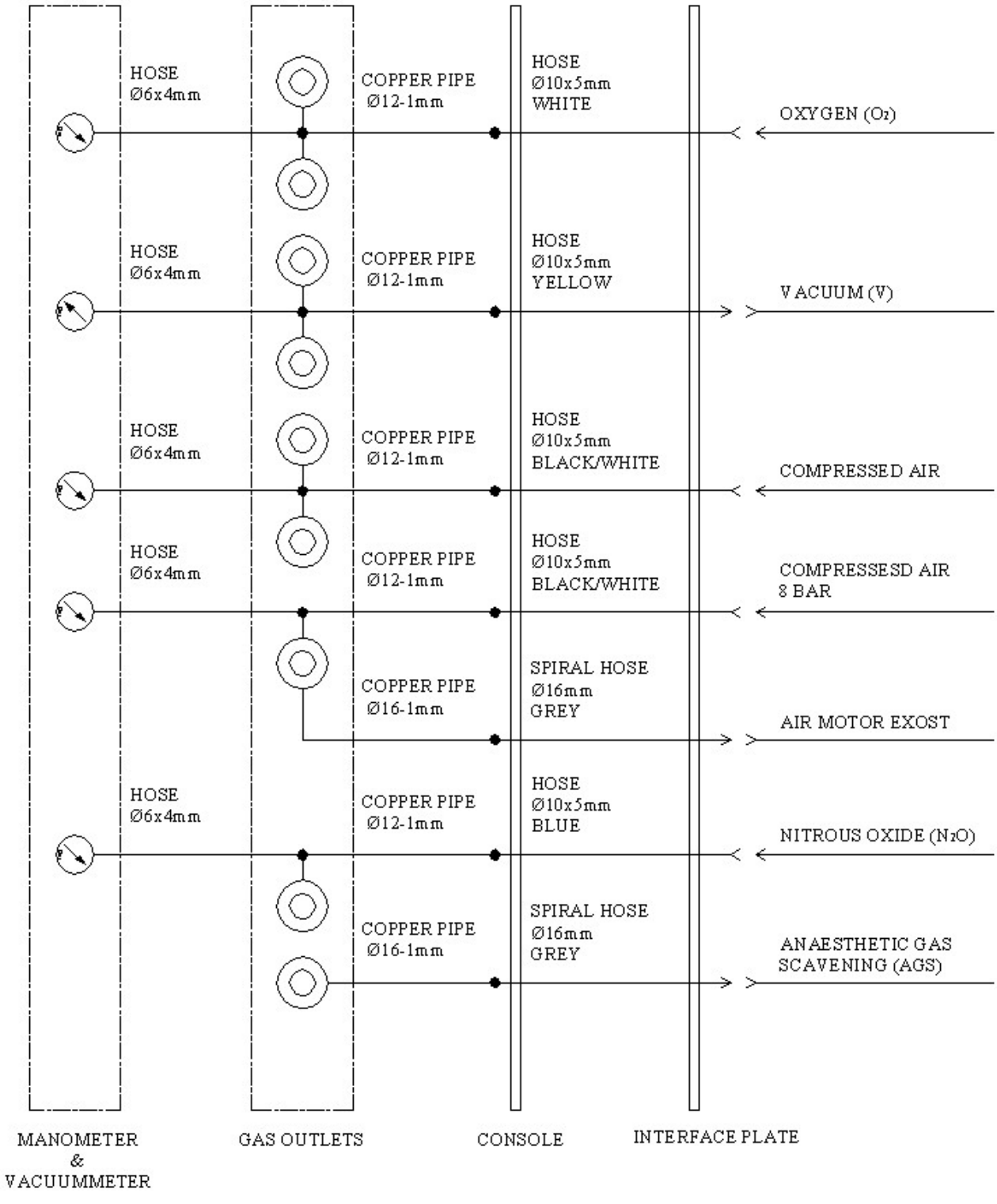
The hose connections are each be identified at the hose ends with stick-on labels. The position of the sticker from the hose end is 100mm. Consoles are pre-piped and then pre-fitted with standard colored and labeled hoses (4 m long). If the hoses are shortened, the labeling must be carried out again, as described above.

Procedure:

a- Weld the adaptor fittings onto the piping.
b- Attach the gas hoses to a hose clamp and push onto the appropriate gas pipes.
c- Tighten the hose clamp and check for secure seating.
d- Connect the anaesthetic gas and air motor evacuation hoses and secures with hose clamps.

Setting up, testing and operating medical gas supply apparatus must be carried out in accordance EN 737-2; EN 737-3 and as described in the manufacturer's instructions. Observe the correct allocation of gas hoses to the corresponding supply lines. The person responsible for the centralized medical gas system must have a test carried out to check the type of gas.

12. Typical Gas Supply and Anaesthetic Gas Evacuation Ducts Diagram



13. Appendices

Form 1: Minimum Data For Attachment With Heavy-Load Anchors

At least the following data are to be ascertained:

Operating Company (Name and Address):

_____
_____

Building Scheme (Address and Operating Theatre):

_____
_____

Pendant Type:

_____

Fixing of Pendant Arms:

As in drawing No: _____
Concrete strength class _____
Thickness of reinforced
concrete ceiling _____ cm

Heavy-Load Anchor:

Manufacturer: _____

Name/Size: _____

Approval No. _____

Permissible load for tensile zone: _____ N

Prescribed axle spacing: _____ mm
(Observe load reduction as per approval)

Tightening torque moment: _____ Nm

Hole depth min: _____ mm
Fixation depth min: _____ mm
(all data from dowel manufacturer's documents)

Number: _____ items

Form 2: Declaration Of Acceptance

Unless this confirmation is presented, the BRIDGE pendant arms may not be installed!

This confirms that the load-bearing ceiling and the ceiling fixation is secure and adequately load-bearing for the pendant arms designated below, provided the above stated conditions apply.

Project:

_____

_____

Ceiling Fixation:
(Please cross where applicable)

- with counter-plate ☐
- with heavy-load anchors ☐

Site of Installation

_____
BRIDGE:

_____
SITE

_____
Signature/ Stamp
(Structural Engineer/Building Authorities)

BRIDGE

Pendant Arm

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